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PROCEEDINGS

OF THE

AMERICAN PHILOSOPHICAL SOCIETY

HELD AT PHILADELPHIA

FOR

PROMOTING USEFUL KNOWLEDGE.

Vol. XXVI.

JANUARY TO DECEMBER, 1889.

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No. 129.

Portions of the Journal of André Michaux, Botanist, written during his Travels in the United States and Canada, 1785 to 1796. With an Introduction and Explanatory Notes, by C. S. Sargent.

(Read before the American Philosophical Society, October 19, 1888)

PREFACE.

The younger Michaux, in the year 1834, presented to the American Philosophical Society the manuscript diary kept by his father during his travels in America. The first parts had been unfortunately lost in the wreck of the vessel in which Michaux returned to France from America, and no record is preserved of his travels in this country from the time of his arrival in New York in September, 1785, until his first visit to South Carolina in 1787.

Reference is made to this Journal by Deleuze in his biographical memoir of Michaux, printed in the fourth volume of the *Annales du Muséum* in 1804, and, doubtless, he had access to its pages, as without them he could scarcely have followed the footsteps of the French botanist through the wilds of the American continent. The first notice of the Journal which appeared in this country is found in a paper by Prof. Asa Gray, entitled *Notes of a Botanical Excursion to the Mountains of North Carolina*, published in the *American Journal of Science*, in 1841, in which some account of Michaux's American travels and discoveries, with short extracts from his Journal, appear. A more detailed account of those parts of this document which relate to Canada, with notes upon Michaux's Canadian plants, was published in 1863 by the Abbé Ovide Brunet under the title of *Notice sur les Plantes de Michaux et sur son Voyage au Canada et à la Baie Hudson*. These brief extracts directed the attention of botanists to this record of the travels of one of the most interesting and picturesque figures in the annals of botanical discovery in America; and for many years the feeling has existed among them that the Journal which furnishes an important chapter in the history of the development of American botany should be published. The American Philosophical Society having shared in these views,

a copy of the manuscript has been placed in my hands for publication. It is now printed as Michaux wrote it by the light of his lonely camp-fires, during brief moments snatched from short hours of repose, in the midst of hardships and often surrounded with dangers. The character of the man appears in this record of his daily life; and any attempt to correct or extend his words would destroy their individuality and diminish the historical value of his diary.

The Journal is something more than a mere diary of travel and botanical discovery. The information which it contains in regard to various plants first detected by Michaux is valuable even now; and his remarks upon the condition of the remote settlements which he visited in the course of his wanderings are interesting and often amusing. They record the impressions of a man of unusual intelligence—a traveler in many lands who had learned by long practice to use his eyes to good advantage and to write down only what they saw.

The duty of preparing the Journal for the press has fallen to me not from any especial fitness of mine for the task, but rather because no other hand was available for it. And it is to my old friend, Mr. John H. Redfield, of Philadelphia, who has aided me in this work constantly and untiringly, and not to me, that should be given the thanks of botanists for placing within their reach the story of Michaux's researches in a field which they have cultivated since his time with so much zeal and success. For without his assistance the publication would never have been begun, and could not have been finished.

C. S. SARGENT.

Arnold Arboretum, Brookline, Mass., December, 1888.

ANDRÉ MICHAUX.*

André Michaux will be remembered as long as North American plants are studied or cultivated. He was the first botanist who ever traveled extensively in this country, although it must not be forgotten that John and William Bartram, his predecessors by several years in the same field, did much to prepare the way for his wider and more detailed explorations. The first connected and systematic work upon the flora of North America was based largely upon his collections and bears the impress of his name, while it was by his efforts that many American plants were first made known in the gardens of Europe.

Michaux was born at Satory, in the neighborhood of Versailles, on the 7th of March, 1746, on a farm situated in the public domain, and carried on by his father. His early training was all directed to preparing

*This sketch of Michaux's career is based largely upon the memoir by M. Deleuze, published in the Third Volume of the *Mémoires du Muséum National d'Histoire Naturelle* Paris, 1804.

him for the simple and laborious life of a farmer of the middle class, and his schooling ended in his fourteenth year. His father died three years later, and André and his brother became joint managers of the farm. This arrangement lasted for four years, during which the self-reliance and power to resist hardship and fatigue, which later distinguished the explorer of the Persian deserts and of the trackless wilds of the Carolina forests, were no doubt acquired and developed.

Michaux married, in 1769, Cecil Claye, the daughter of a rich farmer of Beauce, who died a year later in giving birth to a son, François André Michaux, the historian of the forest-trees of North America. The sudden termination of his married life made a more active and exciting occupation necessary to him and ended his agricultural career. Fortunately one of his neighbors, devoted to horticulture and botany, became interested in the young man and directed his attention to these subjects; and he soon became inspired with a desire to travel for the purpose of bringing back to France the useful plants of other countries, especially those of the Orient. This idea became so fixed in his mind that he gave up his farm and devoted himself to the study of natural history and languages, and having the good fortune to make the acquaintance of Bernard de Jussieu, at that time in charge of the gardens of the Trianon, he passed some time with him there, and afterwards at the Museum in Paris, in perfecting himself in botany. Michaux's first journeys were made at this time. He visited England and studied the English collections of plants, and English methods of horticulture, and in 1788 was invited to join a party of botanists, including Lamarck and Thouin, in an excursion to the mountains of Auvergne. The zeal, activity and enthusiasm of the young collector were the admiration of the party, and led no doubt to his selection shortly afterward to accompany the French consul, Russeau, to Persia. The royal treasury supplied the money for this journey.

Michaux left Paris in 1782 for Aleppo and Bagdad, which he reached after a journey of thirty days across the desert; here he separated from the consular party for the purpose of exploring the country between the Tigris and the Euphrates. He traveled extensively and mastered Persian, even writing, one of his biographers tells us, a dictionary of that language. This journey nearly cost Michaux his life at the hands of a party of marauding Arabs who seized and stripped him and were about to end his days, when he was rescued by the English consul at Bassora, who supplied him with the means of continuing his journey to Ispahan. Two years were then devoted to the exploration of the little known region between the Indian ocean and the Caspian sea. From this long and arduous journey Michaux returned to Paris early in 1785, bringing with him a valuable herbarium and a large collection of seeds. The hardships and sufferings which he had endured only served to stimulate his love of adventure and remarkable energy; and he had scarcely arrived in Paris before he was planning another journey which was to embrace the country east of the Caspian sea and to extend into Cashmere and Thibet. Fortunately, however, for the

United States he was unable, through a lack of financial support, to carry out these plans.

Michaux was not destined, however, to remain long in France. The government was anxious at this time to introduce into the royal plantations the most valuable trees of eastern North America, and Michaux was selected for this undertaking. He was instructed to explore the territory of the United States, to gather seeds of trees, shrubs and other plants, and to establish a nursery near New York for their reception, and afterwards to send them to France, where they were to be planted in the Park of Rambouillet. He was directed also to send game birds from America with a view to their introduction into the plantations of American trees.

Michaux, accompanied by his son, then fifteen years old, arrived in New York in October, 1785. Here, during two years, he made his principal residence, establishing a nursery, of which all trace has now disappeared, and making a number of short botanical journeys into New Jersey, Pennsylvania, and Maryland. The fruits of these preliminary explorations, including twelve boxes of seeds, five thousand seedling trees and a number of live partridges, were sent to Paris at the end of the first year.

Michaux's first visit to South Carolina was made in September, 1787. He found Charleston a more suitable place for his nurseries, and made that city his headquarters during the rest of his stay in America. Michaux's journeys in this country after his establishment in Charleston are detailed in the Journal. They cover the territory of North America from Hudson's Bay to the Indian river in Florida, and from the Bahama islands to the banks of the Mississippi river. His ambition to carry out his instructions was equaled only by his courage and industry. The history of botanical exploration records no greater display of fortitude and enthusiasm in the pursuit of knowledge, than Michaux showed in his journey to the headwaters of the Savannah river in December, 1788, when his zeal was rewarded by the discovery of *Shortia*, or in the return from his visit to Hudson's Bay. The hardship of this last journey even did not satisfy his cravings for adventure and discovery; and shortly after his return he laid before the American Philosophical Society a proposition to explore the unknown region which extended beyond the Missouri. His proposition was well received. The sum of five thousand dollars was raised by subscription to meet the expenses of the journey; all arrangements were made and he was about to start when he was called upon by the Minister of the French Republic, lately arrived in New York, to proceed to Kentucky, to execute some business growing out of the relations between France and Spain with regard to the transfer of Louisiana. It was this suggestion of Michaux, no doubt, which led Mr. Jefferson, who had regarded it with great favor, to send a few years later the first transcontinental expedition to the shores of the Pacific.

This political journey, and a second made into the far West, occupied Michaux for nearly three years longer. He returned finally to Charleston in the spring of 1796. His nurseries were in a most

flourishing condition; they were stocked with the rarest American plants collected during years of labor and hardship; and with many of those plants of the old world which Michaux was the first to introduce into the United States. His services to this country in this way were considerable. The tallow tree, *Stillingia sebifera*, now often cultivated and somewhat naturalized in the Southern States, and the beautiful *Albizia Julibrissin*, were first planted in the United States by him. The possibility of improving the condition of this country by the introduction of the Olive and other foreign trees was a subject which always deeply interested Michaux, and his knowledge of botany and of the agriculture of the Old World was invariably placed at the disposal of the people among whom his travels carried him. It is said that he first taught the settlers in the Alleghany mountains the value of the Ginseng, and showed them how to prepare it for the Chinese market—a service which gained for him a membership in the exclusive Agricultural Society of Charleston.

His movements for several years had been impeded, and the success of his journeys interfered with by the lack of financial support from the French government, and Michaux found, on his return to South Carolina, that his resources were entirely exhausted. An obscure botanical traveler, almost forgotten in a distant land, had little hope of recognition from Paris during the closing years of the last century, and it was now evident that he could depend no longer on support and assistance from France. He determined, therefore, rather than sell the trees which he longed to see flourishing on French soil, to return to Paris.

Michaux sailed from Charleston on the thirteenth of August, 1796. The voyage was tempestuous and ended in disaster. On the eighteenth of September the vessel encountered a severe storm off the coast of Holland. She was blown upon the shore and the crew and passengers, worn out by exposure and fatigue, would have perished but for the assistance of the inhabitants of the little village of Egmont. Michaux fastened himself to a plank and finally was washed ashore, unconscious and more dead than alive. His baggage was lost, but his precious packages of plants which were stored in the hold of the vessel were saved, though saturated with salt water. He remained in Egmont for several weeks to regain his strength and to dry and rearrange his plants, and did not reach Paris until January. He was received with great distinction and kindness by the botanists of the Museum, but a bitter disappointment awaited him. An insignificant number only of the six thousand trees which he had sent to France during the eleven years he had passed in America remained alive. The storms of the Revolution and of the Empire had swept through the nurseries of Rambouillet, and Michaux's American trees were destroyed or hopelessly scattered.

This was the greatest disappointment of his life, but he was not discouraged. All his influence was employed to secure from the French government another commission to return to America for a fresh supply of material for the Rambouillet nurseries. He was not, however, to see the

New World again. His salary had not been paid for seven years, his personal resources were exhausted, and the government was unwilling or unable to assist him.

Baudin was about to sail for New Holland on his voyage of discovery, and Michaux was given the opportunity of accompanying him as naturalist. He finally accepted this offer, somewhat unwillingly, for his thoughts and his longings were all directed towards America, and only on condition that he might leave the vessel at the Isle of France, should circumstances seem to make it desirable for him to do so. Baudin sailed on the 18th of October, 1800, and touched at Teneriffe, where Michaux was able to make valuable botanical collections, and reached the Isle of France on the 19th of February, the following year. Here after a stay of six months, in which Michaux made his first acquaintance with the vegetation of the real tropics, he left the party for the purpose of exploring the island of Madagascar, which seemed to offer a more useful field than New Holland for his labors.

He landed on the east coast, and at once set about laying out a garden in which he hoped to establish, provisionally, the plants he intended to bring back from his journeys in the interior. Impatient of the delays caused by the indolence of the natives he had employed to prepare the ground, Michaux, in spite of the warnings of persons familiar with the danger of exposure and over-exertion under a tropical sun, insisted upon working himself day after day. He was soon prostrated with fever, but his vigorous constitution and indomitable will enabled him to resist the attack, and his health being partially restored at the end of four months he was ready to start for the mountains. His preparations were all made, but on the eve of his departure, late in November, 1802, he was attacked again with fever, and died suddenly.

André Michaux was only fifty-six years old, still in the prime of life and possessed of all his powers, when his useful career was thus suddenly brought to an end. Personally little is known of Michaux beyond what may be learned from the perusal of his Journal. No portrait of him is now known to exist.* He is said to have possessed a frank though somewhat taciturn nature, a not uncommon character in men who have passed their lives in solitary wanderings or who have been long exposed to the hardships and the dangers of the wilderness. His tastes were simple, and the independence of his character was only equaled by his modesty and unostentatious kindness to all persons with whom his wanderings brought him in contact.

Michaux's cultivation and literary ability, judged by his Journal, were not great; and his reputation as an author is due to the fact that his name was printed upon the title page of the classical "*Flora Boreali-Americana*," which Richard drew up largely from the plants collected by Michaux in

* According to DeLouse, the administration of the Museum voted in 1804 to place a bust of Michaux in the garden in recognition of his services to natural science. It does not appear, however, that it was ever made; at least the botanists of the Museum have now no recollection of it, and I have been unable to find any trace of this or of any other portrait of André Michaux.

North America, and upon the "*Histoire des Chênes de l'Amérique*," which, if Richard did not write, he or some author of greater literary skill than Michaux possessed must have recast and corrected. The work upon the Oaks did not appear till 1801, when Michaux had left France for Madagascar, while the Flora was not published until 1803, a year after his death. Two shorter memoirs are ascribed to the pen of Michaux—an article upon the Date Palm and its Cultivation, read before the National Institute of France and published in the *Journal de Physique*, and a paper containing the results of his observations upon the Ginseng communicated to the Agricultural Society of Charleston.

The reputation of Michaux, however, does not depend upon his literary attainments and achievements; he worked in the field and in the forest and not in the closet. Not one among the self-sacrificing explorers and collectors of the plants of this continent better deserves the gratitude and appreciation of the world of science. No one of them has ever seen more clearly, or has endured more willingly and uncomplainingly the perils and hardships of the frontier and the wilderness. His eye always detected the rarest and the most interesting plants—the ambition and long the despair of the plant-hunters who have now for a century been following in his footsteps.*

C. S. S.

MICHAUX, THE YOUNGER, TO THE AMERICAN PHILOSOPHICAL SOCIETY,
PHILADELPHIA.

Pendant près de onze ans que mon Père a presque chaque année visité une partie de l'Union, il n'a cessé d'éprouver dans ses voyages la bienveillance la plus marquée de la part des habitants des endroits où il faisoit quelque séjour. Le plaisir qu'il en ressentoit étoit du à la bonté de son caractère et à sa sévère moralité. Partout on ne cessoit d'admirer son zèle ardent pour ajouter aux progrès des sciences naturelles et plus particulièrement de la Botanique.

Campant presque toujours dans les bois, c'étoit la nuit à la lueur du feu que mon père écrivoit les remarques qu'il avoit faites dans le jour.

Si ces journaux que j'offre à la société Philosophique de Philadelphie (à la quelle j'ai l'honneur d'appartenir) ne renferme rien qui soit utile aux Botanistes Américains à venir, au moins ils pourront être assurés d'avoir sous les yeux, les notes tracées par la main d'un homme qui consacra une grande partie de son existence au progrès de la Botanique: L'existence qu'il perdit (si je puis m'exprimer ainsi), *les armes à la main* dans des laborieuses recherches, sur les côtes de l'Isle de Madagascar.

F. ANDRÉ MICHAUX.

Paris le 15 Janvier, 1824.

P. S.—Les deux cahiers de 1785 (septembre) à 1787 ont été perdus dans son naufrage sur les côtes de Hollande.

* It is only two years since *Shortia* was discovered in or near Michaux's original locality. His other plants have, I believe, all been found, with the exception of *Illicium parviflorum* (since collected, however, by Charles Wright in Cuba).

JOURNAL DE ANDRÉ MICHAX.

2d CAHIER. 1787.

Avril, 1787.

Journal de mon Voyage.

Jeudy—19 Avril venu de Charlest. à la Plant.

Le 19 Avril 1787 parti de la Plantat. et venu coucher à Ashley ferry 10 M.

Le Venredy 20. *Styrax angustifol.* et *latifol.* en fleur, *Nyssa aquatica* en fl. et *Sarracenia lutea altera species.* Venu à un Mille ou deux de Parker's ferry distant de Charleston de 32 Milles.

Le 21. sur les bords de la rivière en entrant dans le bois ; à main gauche, avant de passer le ferry nommé Parker's ferry sur la rivière Eddisto, trouvé un *Gleditsia* . . . trois esp. de *Mespilus* et un arbriss. laitieux fleurs en grappes non epanouies et quelques fruits de l'année dernière ressemblans à un *Tithymalus* (*Stillingia*),* plus un pin à 2 feuilles. † En continuant la route pour passer à Ashpao ferry j'ai trouvé plusi. Pins à deux feuilles. Nous sommes venus coucher à deux Milles au de la de Ashpao ferry.

Le Dimanche 22. passé le ferry nommé Combahee bridge situé à dix Milles du précédent sur Combahie riv. Un peu avant d'arriver à ce ferry entre la Pl. de M. Dais recueilli une Plante bulbeuse fl. en Spathe (*Pancreatum mexic.* ‡) au nombre de 2 communement. Cal. tubulé partagé régulièrement en 6, six étam, dont les filets étant très longs sortent de l'extrémité d'une espèce de corolle (blanche) nectarife ; pistille long, germe inferieure. Après avoir passé le ferry à la distance de q ques milles on trouve assez abondamment le *Nyssa* à larges f. dentées.

Le 23 notre marche fut de 13 milles et nous passames . . . Nous traversames plusi. prairies steriles et humectées continuellement par la Mer, ne produisant que des joncs.

Arrivé au lieu du campement je recueillis§ une *Verbena longiflora* Cal. 5 partit. laciniis subulatis. Coroll. presque irregulière, tub. long. Entrée de la Cor. velue et le tube audessous des etam. aussi velu. Etam. 4 dont il y en a 2 plus courtes. Pist. germe à 4 angles style de la longueur du tube.

Fleurs en Epi. ; f. oppos. pinnatifides.

Le 24 Avril. notre marche fut de 12 Milles et nous campames à 7 Milles de dist. des Towl Sisters. Notre marche fut toujours dans les bois, nous vimes seulement trois plants. situées a q qu. distances de la route et sur des lieux bas et moins stériles. En général on ne peut voyager dans un pays plus stérile. Les bois sont compos de Pins. Dans les parties humides, je vis des *Nyssa aquatica* *Cupressus disticha* et *Gordonia lasianthus*.

Le 25 nous fines une traite de huit Milles et nous vimes loger à la

* *Stillingia ligustrina*, here noticed for the first time.—C. S. S.

† Probably the *Pinus glabra* of the *Flora Caroliniana*, published one year later in London, by Thomas Walter.—C. S. S.

‡ *Pancreatum rotatum*.—C. S. S.

§ *Verbena subulata*.

‡ Two.—C. S. S.

maison du ferry sur la rive gauche de la rivière Savannah, située à une distance égale de Parisbourg et de Abicorn.

Pendant cinq ou six milles, le terrain continua d'être aride ne produisant q. des Pins et dans les lieux humides des Cyprès.

Trois milles avant d'arriver au ferry, il parut argilleux et ensuite nous trouvâmes un sol sablonneux, mais inégal et formé en collines produisant beaucoup de plantes que je n'avais pas vu précédemment. Je recueillis deux espèces de Lupins, scav. *Lupinus perennis* et le *Lupinus pilosus* ;* deux espèces de *Verbena* scav. *Verbena . . .* et *Verbena caroliniana*. Deux espèces d'*Asclepias*. Plusi. espèces de *Tythymalis*. Dans les swamps, le *Nyssa* à f. dentées, *Stillingia sylvatica*. Une espèce d'*Annona*, † etc.

En arrivant sur le bord de la riv., je vis le *Sideroxylon tomax*. ‡ Un *Ligustrum* § (monospermum ?).

Annona 2 espèces, *Magnolia grandif.*

Dans les lieux submergés et couverts *Betula papyrifera*, || *Platanus*, *Gleditsia*, *Nyssa*, etc., etc.

Je tuai le matin un tres beau serpent à bandes jaunes, noires et rouges, ces coul. étoient bien vives et bien marquées. Je tuai trois serpents de l'espèce appel. Mocassine, l'un était de 3 pi. 9 pouces de long et 8 po. de circonf. Mon fils tua une autre espèce appelée Black Snake, serp. noir. Celui-ci est l'ennemi du serpent sonnette et quoiqu'il ne soit pas venimeux, il réussit à le faire périr uniquement par sa vitesse et la rapidité de sa course (si l'on peut nommer course l'action progressive d'un animal qui n'a point de pieds). Le serpent sonnette se traîne pesamment et s'éloigne rarement du lieu de sa retraite qui est ordinairement les cavités formées par les racines et la terre d'un arbre pourri ou renversé. Lorsque le serpent noir rencontre son adversaire, il court avec rapidité sur son corps et passe au de là. il revient avec la même vitesse et continue jusqu'à ce que le serpent sonnette par les efforts reiterés pour mordre son ennemi, se mord lui même et se donne ainsi la mort par le venin de sa morsure.

Le 26 après avoir visité environ un Mille sur cette riv. nou passâmes dans un bateau de l'autre côté de la riv. que nous descendîmes pendant 4 Milles jusqu'à un endroit bordé de collines et couvert de bois ou je recueillis le *Dirca palustris*, *Kalmia* qui diffère un peu du *latifolia* par la couleur des fl. Un *Azalea coccinea* ¶ dont la couleur est un rouge foncé dans toutes les parties de la fleur. Quoiqu. cette couleur ne soit pas très vive, cet arbrisseau sera un des plus agréables pour l'ornem't des Jard. Il paroît avoir du rapport av. l'*Azalea nudiflora*.

Je recueillis la *Silene Virginica*, je vis beaucoup de *Chionanthus* Un Mag-

* *L. villosus*, Willd.—C. S. S.

† *Asimina parviflora* Dunal, a common plant in this region.—C. S. S.

‡ *Bumelia tenax*.—C. S. S.

§ *Olea Americana*.—C. S. S.

|| No doubt *B. nigra*, the only species found near the coast of the Southern States.—C. S. S.

¶ *Rhododendron nudiflorum* Torr. (*Azalea canescens*, Michx.).—C. S. S.

nolia en fleurs de la grandeur et de la forme de celles du Magnol. tripetala, odeur très agréable au lieu que dans le Magn. tripet. L'odeur de son bois est agréable mais celle des fl. ne l'est pas ; il diffère du Magnol. par ses feuilles qui sont petiolées de la longueur de deux pouces et cordiformes à l'insert de la feuell. qui est longue et terminée par une espèce de 3 angles.* Un très grand arbriss. que je crois l'Andromeda arboorea, il n'était pas en fleur, mais les grappes de sem. de l'ann. précéd. et le gout acide des f. me firent juger que ce peut être l'And. arborea. Nous passames le ferry vers les 2 h. apr. Midy et nous trouvâmes les chem. si mauvais que no. fîmes seulement deux milles in 5 heures de temps. Il fallut passer de la hauteur des jambes des chev. dans la Vase et qq. f. dans l'eau. Dans un endroit où le pont avoit été rompu il fallut que les chev. passassent à la nage.

Le 27 nous retrouvames le sol assez aride, mais dans les ravines ou ruis. d'eau qui ne coule pas continuellemt. je recueillis l'Azalea† couleur de feu. La couleur de cet Azal. qui est dans toutes les parties de la fl. aussi foncée, Corolle, Etam. et Pistille, est celle de l'Hermercallis fulva, mais dans les lieux plus découverts et moins ombragés cet couleur est encore plus forte. Apres avoir marché pendt Milles nous arrivâmes à une espèce de mauvais hameau appelé ici ville, composé seulement de 4 ou 5 maisons. Ce lieu est nommé Ebenezer. A un Mille de ce lieu, touj. en suivant la route de Savannah dans des lieux bas couvert de *Belula papyrifera*‡ et près d'une rivière nommée . . . je recueillis la *Gleditsia*§ capsula ovali unicum semen claudente, j'y recueillis plusi. Plantes remarquables ; une espèce d'*Asclepias*|| à f. oppo. étroites, tig. tres menues, grimpantes, les fl. ne paraissoient pas encore, mais les siliq. de l'année précédente étoient rassembl. en bouquets, tres longues et menues ; je trouvois q. ques sem. à aigrettes dans les Siliques. Je recueillis dans ce lieu un autre arbriss. grim pant ayant beaucoup de rapport au *Bignonia sempervirens*. Un *Polygala rosea*? Un *Astragalus*, etc., etc. *Arethusa divaricata* et *Arethusa*¶ ophioglossoides et une autre espèce que je nommé *Limodorum*. (Nota : ayant trouvé l'*Arethusa bulbosa* aupres de New York, outre que j'ay completté les trois espèces indiquées par Linn., j'ai aussi acquis une 4me.) Nous couchâmes dans une Plantation habitée par une Hollandaise qui nous fournit plusi. provisions et la permission de visiter ses Bois ou je trouvai une variété du *Halesia* nommée par q. q. une diptera.

Le 28 Nous marchâmes pendant douze Milles.

Le Dimanche du 29. notre marche fut de neuf Milles et nous vinmes camper auprès de Savannah.

Le 30, nous restames à Savannah. Le Matin je fis une herborisation, je

* *Magnolia Fraseri*, Walt.—C. S. S.

† *Rhododendron calendulaceum*, Torr. (*Azalea calendulacea*; the var. *a. flammea* of Michaux's Flora, 1, 151).—C. S. S.

‡ *B. nigra*—C. S. S.

§ *Gleditsia monosperma*.—C. S. S.

|| *Asparagus cyananthinum*. (Perhaps a species of *Gonolobus*.—C. S. S.)

¶ *Pogonia. Calopogon pulchellus*.—C. S. S.

vis une espee de* Palmier different du Chamærops de Caroline ayant une tige au lieu que celui des environs de Charleston est sans tige, ses feuilles sortent de la souche intéri. aussi bien la tige qui porte la fructification, de même que dans l'Osmunda cinnamomea. Les feuilles different aussi et j'en parleraycyaprès. Je revins bientôt à la ville et je passay la journée à des visites.

Le premier May 1787, la journée fut employée à faire les provisions nécessaires pour continuer notre voyage. La ville de Savannah est composée d'environ cent cinquante maisons situées près la rivi. de ce nom, sur une hauteur formée par des sables que les vents ont accumulés. La ville est tracée régulièrement, mais le peu de maisons qui y sont construites, n'y font pas apercevoir cette regularité dont se vantent les habitants. Les rues sont très larges et le sol qui est formé d'un sable mouvant augmente la chaleur et l'incommodité que l'on éprouve dans ce climat qui est toujours très chaud.

Le 2. nous marchâmes pendant douze milles et la pluye nous obligea de coucher dans une petite maison inhabitée qui se trouva près de la route. Je vis plus de Magnolia grandiflora que je n'en avais vu précédemment. Des Nyssa fol. acute dentatis et un Tradescantia umbellata florib. roseis.

Le 3 May nous marchâmes pendant seize milles. Nous passâmes Ogechee ferry situé sur la rivière d'Ogechee et un mille avant d'arriver à ce ferry je trouvay la Nyssa-Ogechee† de Bartram. Cet arbre pourrait être regardé comme un arbrisseau s'il ne differe point de grandeur dans d'autres lieux. Il a beaucoup de rapport av. la Nyssa foliis acute dentatis, ‡ mais les feuilles sont ovales et tout à fait entières, velues par dessous. Sur les bords de cette rivière aux lieux inondés et parmi les roseaux je recueillis la Zizania palustris§ 6 étamines dans les fl. ♂, et les fleurs ♀ separées, mais sur le même pied. Au même lieu, je recueillis le Pancratium mexicanum parmi les roseaux, les endroits les plus humides et même q. q. fois submergés.

Le 4, notre marche fut de huit milles et je ne vis rien de très remarquable. Lé pluye de la nuit précadente avoit retardé notre départ.

Le 5. notre marche fut de six milles et nous trouvâmes abondamment un Andromeda que je nommeray ferruginea, un Kalmia? repens dont les feuilles sont poi ues. Les fl. sont très tardives. A force de chercher je trouvay une sorte fl. dont les étamines diffèrent de celles des autres Andromeda. Je recueillis un Arum à tige maculée, mais le Spathe aussi blanc que la fleur d'un Lys. Je recueillis une autre plante de la famille des Annon. | Cal. 3 phyll. Pet. 6, 3 interiorib. Nectariferis st. plurima Germina 5.

* Chamærops recurvata caule. (*Sabal serrulata*, R. & S.—C. S. S.)

† Bartram's name of *Nyssa Ogeche* adopted by Marshall in his *Arbustum*, published in 1785, may properly supersede Walter's name, *N. capitata*, which was not published until three years later (1788). Following the common spelling of the name of the river, it should, however, be written Ogechee.—C. S. S.

‡ *N. uniflora* Walt.—C. S. S.

§ *Zizania miliacea*. Michaux, *Flora*, i, 74.

| *Annona lanceolata*. (One of the dwarf species of *Asimina*.—C. S. S.)

Le 6 May nous sejoûnâmes à Sunbury et nous essayâmes les moyens d'aller à St. Augustine, mais nous révinmes à 6 milles House. Ce même jour mon fils partit avec un domestique et un autre voyageur anglois pour aller visiter les bords de la rivière Altamaha et moi je vins sejourner dans une auberge située à 6 milles de Sunbury à cause d'un mal de la jambe qui empirait depuis plusieurs jours. Ce mal fut causé par la piqure d'un insecte dont les bois sont remplis et le frottement continuel du cheval sur cette partie produisit un absès et une inflammation considérable.

Le 7. Je visitay à pied les environs, je m'occupay à decrire plusieurs plantes que le temps ne m'avoit pas permis les jours précédents. Le 8 fut employé aux mêmes occupations.

Le 9 mêmes occupations et je tiray par écrit le nombre des plantes recueillies, je rangeai mon herbier par ordre.

Le 10. Je me mis en route pour Augusta et notre marche fut de vingt cinq milles. Nous passames la riv. Ogechee.

Le 11 nous marchâmes pendant vingt cinq milles et nous vinmes coucher à Fifteen milles House, quinze milles de distance de Savannah.

Le 12 May, notre marche fut de six milles et nous avons campé à vingt et un milles de Savannah et environ quatre milles d'Ebenezer. Une petite rivière qui passe cet endroit au bas de la prairie ou nous avons campé, me procura la récolte d'un *Halezia* diptera dont j'avois toujours douté jusqu' alors; je recueillis le *Populus heterophyl.* un arbrisseau à f. oppo. les fruits murs et tombés la plupart avoient la ressemblance de celui d'un *Viburn.* Un *Mespilus?* très grand arbriss. à fruits très rouges* sur la colline qui borde cette rivière. Le *Zizania palust.* *Chelone glabra,* *Gleditsia aquatica* *Vinca lutea?* Vers le soir sur un creek qui borde la maison d'une Veuve Hollandoise, je vis plusieurs *Halezia* diptera, grand arbrisseau et dans ce Creek beaucoup de *Zizania palust.*

Le Dimanche treize May, nous avons fait quinze milles et nous avons campé sur la chaîne de Collines qui borde la rivière de Savannah vis à vis du ferry appelé Two Sisters (les deux soeurs). Je retrouvay en cet endroit l'*Andromeda arborea* prêt à fleurir.

Le 14. notre marche fut de neuf milles. Nous passâmes chez le capit. Prevott fils d'un ancien français. Il me mena dans une partie de bois qui abonde en *Annona* dont il faisoit avec l'écorce des cordages assez forts en la faisant rouir.

Le 15 au matin, nous nous aperçumes que nos chevaux avoient été volés depuis une heure. Selon l'usage, lorsque l'on trouve de bonne prairie et que l'on est trop éloigné des habitations, on campe auprès d'une source et l'on met à chaque cheval une sonnette. J'avois pratiqué toutes ces précautions. Outre cela, j'avois coutume de me lever plusieurs fois dans la nuit, je les vis à 3 heures du matin et à 4 heures un quart ils étoient disparu.

Nous les cherchames toute la journée et nous envoyâmes de tous les

* This could only have been *Crataegus nivalis*, Torr. & Gray, as no other species could have had red fruit in the month of May.—C. S. S.

côtés pour avoir des informations. Les habitants du lieu, nous dirent qu'ils avoient été volés. Nous rencontrâmes deux particuliers qui couroient armés après un certain Capitaine connu dans les environs pour voler les chevaux.

Le 16. nous fumes occupés aux mêmes recherches et nous vîmes coucher seulement à quatre milles de distance, dans une auberge.

Le 17 nous envoyâmes des Lettres aux différentes parties du District, particulièrement chez le capitaine Major Revots et à Savannah. Enfin je résolus de continuer avec mon fils le voyage à pied et nous vîmes coucher seulement à trois milles de distance de l'auberge. Le maître de l'auberge ou nous passâmes la nuit, nous promit, moyennant une récompense de faire tous ses efforts po. les retrouver s'ils étaient seulement égarés et la 18. nous passâmes une partie de la journée à les chercher. Nous vîmes cependant coucher à quatre milles de distance du lieu d'où nous étions partis.

Le 19. notre marche fut de quatorze milles et nous campâmes près d'un pont sur la rivière Beaver Dam Creek. Un peu avant d'arriver à Beaver Dam je recueillis sur la route, étant alors à 60 milles de distance d'Augusta, un *Rumex** arbriss. que je nommeray *Lapathum occidentale*, grand arbriss, de 25 à 30 pieds de haut. il se trouve aussi près. de la rivière Altamaha. d'où mon fils me l'avoit apporté les jours précédents.

Le Dimanche 20 May, nous avons fait une marche de quatre milles et nous couchâmes dans une petite maison située près de la route, à cause de la pluie. Le sol est très sablonneux et stérile.

Le 21. notre marche fut de 10 milles et nous campâmes pres une auberge située à 45 milles d'Augusta. Le sol change en ce lieu et est une argile mêlée de sable; dans quelques parties, ferrugineux. Il est garni de q. ques collines sur les quelles je reconnus le *Calycanthus* et le *Robinia hispida*. Nous eûmes la certitude en ce lieu que nos chevaux avoient été volés; un particulier des lieu ou ils furent pris, ayant perdu deux des siens, courut après un certain capit. connu dans les environs po. voler les chevaux. Il l'atteignit et le tua. Son complice qui s'étoit emparé des nôtres, échappa et pris la route de la Nation—Creek.

Le 22. nous avons marché l'espace de dix milles non compris les courses que nous étions obligé de faire hors de la grande route, lorsque nous apercevions des collines ou des swamps ou d'autres variations de sol qui fournissent différentes Plantes.

Le 23 nous avons marché seulement l'espace de deux milles et en descendant une colline, une roue de la voiture qui nous servoit à transporter nos récoltes et nos provisions fut brisée.

La journée du 23 May et du 24 furent employées à visiter plusieurs collines de ce District et je reconnus en ce lieu la *Trillium cernuum* et sessile, *Cypripedium caleeolaria flore luteo*, *Calycanthus* . . . *Zanthoriza* ou *Marboisia* & . . .

Le 25 nous avons fait douze milles en approchant d'Augusta. Nous

* *Brunnichia cirrhosa*, Banks?—C. S. S.

vi nes un sol aride et sablonneux à l'exception d'une partie très humide que nous fû nes obligés de traverser dans l'eau jusqu' aux genoux et le reste se trouva un torrent qu'il fallut traverser sur un arbre moyen à fleur d'eau au risque d'être attaqué par les alligators qui abondoient en ce lieu.

Le 26 nous avons fait dix milles et nous passames une petite rivière dont le pont ayant été rompu par le débordement des eaux, il fallut travailler dans l'eau pour le réparer de manière à y passer avec une voiture. Nous arrivâmes enfin à Augusta. Les Alligators ou Caimans abondent dans les ruisseaux, torrents et swamps de la Georgie et même de la Caroline. Nous cessâmes d'en voir ici et nous aurions été très embarrassés, ayant passé plus de 3 heures dans l'eau po. réparer le miserable pont ou il falloit passer.

Le Dimanche 27, nous sejour-nâmes à Augusta. On est si scrupuleux en Am. q. l'on n'ose pas sortir ni même se promener le Dimanche dans les grandes villes.

Le 28 j'allay visiter le Colonel Le Roy Hammond dont l'habitation est située à 3 milles d'Augusta dans la Caroline du Sud. parce que l'on est en Carol. aussitot que l'on a passé la riv. de Savannah sur laq. Augusta est située. Je revins le même jour parceque le Colonel n'étoit pas chez lui, quoique je reçusse toutes sortes de civilités de son épouse. Je vis aussi deux demoiselles ses nièces qui étoient très aimables et cette maison me parut très distinguée à tous égards pour les bonnes manières, la richesse et l'élégance. Un avocat de Ninety Six se chargea de me donner une lettre de recommandation pour le District de Kiowi ou je me proposois d'aller. Je suivis toujours la riv. po. revenir à Augusta et je recueillis un *Pavia* (*spicata*). Un nouveau *Vaccinium* . . . *Aquilegia*? . . .

Tilia

Annon. . . .

La ville d'Augusta est une des plus agréablement situées de toute l'Am. Sept., mais composée de peu de maisons. Il y a trois ans on en comptoit seulement douze et actuellement il y en a cent vingt, on y manque même des denrées les plus nécessaires aux voyageurs parceq. les habit. font leurs provis. seulement po. eux memes. Les habitants la plupart sont oisifs, joueurs et adonnés au Rum don't les habitants de tout age et de tous rangs en Ameriq. boivent avec excès.

Des négociants anglois y tiennent des entrepots ou magasins po. le commerce des objets necessaires aux habitants des parties reculés derrières de la Caroline et de la Géorgie.

Le 29. la pluye nous obligea de rester toute la journée sans pouvoir partir d'Augusta. Nous fumes informés à Augusta qu'un certain Mr. Fraser* Ecos. envoyé pour recueillir des arbriss. d'ornement au compte des Lépinieristes anglois, avoit perdu ses deux chevaux. Cet homme étoit

* John Fraser, a Scotchman, made several visits to North America between 1780 and 1810, for the purpose of collecting plants and seeds. A sketch of his botanical career, accompanied by his portrait and a list of his principal discoveries and introductions, appeared in the *Companion to the Botanical Magazine*, Vol. II, p. 300. The value of his contributions to Eng'ish gardens has, perhaps, never been surpassed by those of any botanical traveler. —C. B. B.

parti de Charlest. avec moi et avoit juré de me suivre partout ou j'aurois été. J'avois accepté sa compagnie parceque étant anglois, j'avois espéré qu'il auroit plus de ressources po. se procurer les objets necessaires dans ces parties méridionales si peu peuplées. Mais son peu de connaissance en hist. nat. dont il vouloit s'occuper particul. à l'égard des Insectes et en Botaniq. lui faisoit recueillir en abondance des objets de peu de valeur et très connus telsque le *Prinos glaber*, *Ceanothus* . . . *Styrax*. Il perdoit un temps précieux qu'il auroit pu employer à recueillir des objets plus interessants, s'il avoit su les connoitre. Quoique je fusse continuellement fatigué de ses questions et de son ignorance qui jointe au peu de confiance, le portoient à recueillir une infinité de productions monstrueuses dont les plantes sont chargées infiniment plus en Am. que dans l'ancien continent à cause de la temperature humide. J'avois touj. voyagé avec lui en bonne intelligence, mais ayant perdu mes chev. 12 jo. avant d'arriver à Augusta, je profitay de cette circonstance po. lui dire qu'ayant l'intention de chercher mes chev. il ne devoit pas m'attendre plus long temps et continuer son voyage. Dès ce moment nous nous séparâmes.

Le 30 nous sommes partis d'Augusta et nous avons fait seulement cinq milles à cause d'une pluye qui dura toute la journée. Je n'avois aucune affaire à Augusta, mais la difficulté de trouver des provisions nous avoit obligé d'y rester trois jours. Il y a un seul Boulanger et il ne fut pas possible de la résoudre à nous cuire du pain pour q. ques. jours parcequ'il craignoit lui même en manquer. Il ne voulut pas non plus nous vendre de la farine. Nous n'en trouvâmes pas chez aucun Marchand et il ne fut pas possible de trouver à acheter du Mays po. le cheval et de la farine de mays po. notre provision à nous même.

Le 31 nous avons fait douze milles par un chemin rempli de souches et nouveau au travers des bois. Nous rencontrâmes plusieurs plantations dans les quelles nous demandions à acheter de la farine de Mays, car on ne peut se procurer d'autre pain. Un Planteur honnête à 5 milles d'Augusta nous en cêda un demi boisseau. Il se nommait Mr. Pece et nous reçut avec beaucoup de civilités parceque no. étions françois. Il nous régala gratuitement de laitage et autres menues provisions. Il nous dit que le grand nombre de cultivateurs arrivés de la Virginie du Maryland et autres parties sept. pour s'établir dans ces parties reculées de la Georgie avoit tellement fait hausser le prix du mays que l'on craignoit une disette. En effet cette denrée est ici de première nécessité et l'on y voit point de pain de froment. Les auberges y sont rares et l'on est obligé de coucher dans les bois.

Le 1er Juin nous avons fait neuf milles.

Nous passâmes Scot's ferry sur la rivière de Savanah situé à vingt-et un milles d'Augusta. Après avoir passé la rivière, nous avons fait cinq milles sans voir une seule habitation et le chemin peu fréquenté au travers des bois.

Le sol est argilleux rougeâtre et l'on trouve fréquemment des blocs de Quartz pur ; il se trouve des parties de mica et une seule fois je reconnus

du schite argilleux. A deux milles de distance de la riv. le sol est humide et souvent submergé, mais on y voit pas d'Alligators.

Le 2 Juin nous avons fait douze milles sans voir une seule habitation et sans trouver d'eau. Le chemin était à peine frayé. Je tuai deux écureuils noirs et deux oiseaux : l'un étoit une Pic et l'autre un oiseau qui me parut du genre des Pincons gros becs, mais plumage jaunatre, je trouvay dans son gésier des débris de Scarabées.

Je ne trouvay aucune nouvelle plante. Les bois étoient composés de Pins à 2 feuilles.* Chênes noirs blancs, Diospyros etc.

Je rencontray dans un endroit humide l'Andromeda arborea ; un ruisseau qui s'y trouva nous engagea à y souper et à y passer la nuit.

Le Dimanche 3 Juin. nous avons fait dix milles. Le difficulté que nous éprouvâmes à passer un torrent d'eau, nous y retient plus d'une heure et demie, étant obligé de décharger la voiture et de transporter sur le cheval tous les effets, livres, herbiers &c. Nous passâmes sur l'établissement françois appelé la nouvelle Bordeaux. Les habitations sont si écartées les unes des autres que je n'en visitay qu'un seul. Les françois de cet établissement sont généralement estimés po. la probité et les bonnes moeurs. Le sol est bon lorsque l'on arrive au lieu de leur établissement, il est généralement argilleux, de couleur rougeatre et l'on trouve des blocs de quartz adhérent à la terre au lieu que le jour précédent ceux que je vis paroisoient isolés et ne pas faire partie du sol ; en formant une masse générale. Dans les ruisseaux il ne se trouva que du quartz et du mica. Je trouvay sur les bords des ruisseaux la *Dirca palustris* et l'*Andromeda arborea*.

Le 4 nous avons fait seize milles ; nous avons vu un pays peu habité et même deux plantations abandonnées, nous fumes cependant assez heureux de trouver une femme dans une pauvre Plantation qui nous vendit trois liv. de Beurre, nous régala de lait et nous fit du pain avec de la farine de mays que nous avions po. notre provision. Elle y ajouta de la farine de froment et du levain, de sorte que nous eumes de très bon pain. Le soir nous approchâmes d'un lieu plus peuplé nommé . . .

Le sol se trouva ferro-argileux communément et ne produit pas d'herbe de sorte le cheval souffroit beaucoup ; les bois ayant été brûlés partout ou nous passâmes. Nous arrivâmes enfin dans un lieu ou il se trouva de l'herbe et une source d'eau. Nous recontrâmes plusieurs habitans qui revenoient de l'église. Ils nous dirent que nous allions trouver un pays plus habité, que nous ne devions pas craindre de perdre des chevaux en ce lieu, les habitans de ce lieu ayant tous des principes de probité, des bonnes moeurs et de la religion, que ce meme jour, 300 d'eux avoient reçu la communion sacramentale et qu'ils ne souffroient pas des étrangers et des aventuriers sans moeurs, s'établir parmi eux. Il y avoit parmi eux un riche Planteur nommé L'Esquire Coohm qui étoit très respecté des autres. Je trouvay près de la source d'eau beaucoup de l'*Andromeda arborea*, et j'en mesuray un qui portoit deux pieds six pouces de circonference à 3 pieds de terre.

* *Pinus mitis*.—C. B. B.

Le 5, nous nous levâmes à 3 heures du matin po. plier bagage et nous mettre à l'abri sous la voiture afin d'éviter un orage et une pluie très considérable. Le temps devint beau vers midy et nous fîmes quatre milles. Nous arrivâmes à la Plantation du générale Andrew Pickens pour qui j'avois eu une lettre du Colonel Le Roy Hammond près Augusta, il nous reçut très honnêtement et nous couchâmes chez lui.

Le 6, nous avons fait dix sept milles. Nous passâmes chez le capit. Middle à sept milles de distance du Gen. Pickens. Je fis arrangement avec lui po. avoir des Dindons sauvages et il me promit que d'après les informations, à mon retour nous conviendrions du prix.

Nous vinmes coucher chez un Planteur nommé Th. Lee près Rocky river. Le sol se trouva argill. et les pierres ou roches qui se rencontroient étoient de Quartz. Je trouvay q. quefois du granit composé de Quartz, de mica, de schorl et de mineray ferrugineux. J'apperçus un hibou de la grosse espèce comme tous ceux de la Caroline et l'ayant tué, il tomba avec un serpent noir de l'espèce Veep-Coach (fouet de cocher).

Le 7 nous avons fait 15 milles et nous vinmes coucher à Deep-Creek. Le sol fut un peu plus montagneux.

Le 8 nous avons fait 15 milles et nous vinmes à Seneca.

À dix milles de distance, nous traversâmes un torrent (Creek) sur le bord du quel je reconnus l'*Epigea repens*, *Kalmia latifol.* *Panax quinquefolia*. Je me promenay dès le même soir sur le bord d'une rivière qui passe auprès du Fort Seneca, actuellement le Fort Rutlege. Cette rivi. est appelée *Kiwi-river* ;* elle est profonde en differents endroits et d'autres sont remplis de rochers à fleur d'eau ; je recueillis l'*Hydrangea arborescens* et je remarquay le *Cornus alternifol.* *Kalmia latifolia*, *Zanthorhiza* ou *Marboisia*, *Panax quinquetolia*.

Le 9 Juin, nous allâmes av. un françois nommé M. Martin qui s'étoit établi Planteur dans ce lieu po. engager deux sauvages à m'accompagner dans les Montag. qui séparent l'Etat de Caroline des nations sauvages Cherokees, Creek, Chickasaw, etc. . . .

Les sauvages furent très difficiles à consentir à m'accompagner, et non seulement pour le prix qui étoit exorbitant, mais aussi ils voulurent avoir un cheval po. eux deux. Il fut encore plus difficile d'avoir un Interprète et je me résolus à aller seulemt avec un jeune homme et les deux sauvages que je désirois. Je leur donnay Rendez-vous au lendemain po. conclure le traité, et po. les engager à me tenir parole, je leur promis un demi gallon de Rum. Je passai par un lieu abandonné des sauvages et qui avoit été le lieu de la ville nommé Seneca. Je remarquay le *Gleditsia* dont ils se nourrisoient, des Pêchers, des Pruniers sauvages. Je recueillis un chêne noir que je n'avois vu dans aucun autre endroit de Carol. et Geo.

Le Dimanche 10. les Sauvages vinrent avec un chef et plusi. autres de la nation. Après leur avoir bien fait comprendre que je voulois visiter les sources de la riv. Kiwi et de la riv. Tugelo qui r unies, forment la riv. Savannah ; celles qui forment la riv. Tanasé que se perd dans l'Ohio ; et

* The Keowee, the principal eastern fork of the Savannah river.—C. S. S.

que je voulois aller jusqu' à Tanasee ; ils me demanderent chacun une couverture et un Petticoat, la valeur de six dollars chacun po. 12 j. que devoit durer le voyage. Je leurs promis, mais il fallut payer la moitié d'avance parceque disoient-ils beaucoup d'autres Blancs les avoient trompés. Je leur promis en outre que si je revenois content de mon voyage je leur remplirois le ventre de Rum. Ils furent très satisfaits et me dirent qu'ils attendroient le lendemain le moment que je voudrois partir.

Le 11 Juin, plusieurs honnêtes habitants du lieu qui s'interessent à mon voyage me fournirent des Provisions, l'un me fit cuire du pain, fit moudre de la farine de mays, l'autre m'envoya du mays, me prêta un équipage de cheval &c. Je partis avec un jeune homme qui avoit résidé cinq mois chez les sauvages pour le Rendez-vous q. j'avois indiqué et à midi, nous nous mimes en route avec les sauvages que j'avois fourni de poudre et de plomb. Ils me conduisirent alternativement par des montagnes et des torrents que l'on appelle Creeks. Nous passames des endroits très escarpés ce même jour et nous traversames une petite riv. nommée Little river, elle est extrêmement rapide et je fus effrayé lorsque je vis qu'il falloit passer sur des roches qui étoient à un pied q. quefois deux sous l'eau. Le courant étoit si rapide que tout autre qu'un sauvage auroit été entraîné. Ces roches étoient en pente et couvertes d'une mousse gluante. Je craignois la chute d'un de nos chevaux, mais il n'y avoit pas d'autre chemin et les sauvages ne sont pas assez complaisants pour écouter les réflexions que l'on peut faire dans ces circonstances. Les torrents profonds et les bords de la riv. étoient couverts du Rhododendron maximum. Notre journée fut de douze milles. Les sauvages profitèrent du jo. qui restoit po. aller à la chasse, mais n'ayant rien tué tout le pain qu'on nous avoit préparé fut mangé ce même jour.

Le 12, les deux sauvages allèrent dès la pointe du jo. à la chasse et n'ayant rien tué nous mangeames de la farine de mays bouillie dans l'eau. A midy on fit une petite halte pour rafraichir les chevaux et pour boire dans un ruiss. dont l'eau étoit la plus pure et la meilleure q. l'on puisse boire en Amerique. Pour nourriture à l'exemple de mes deux sauvages, je trempay la farine de mays dans cette eau et cela fut notre diner. La mauvaise chère et les mauvais chemins ne me chagrinoient pas tant que le déplaisir de ne trouver aucune plante intéressante depuis le 8 May et je m'occupois souvent du déplaisir d'un tel voyage sans fruit. Nous fimes quinze milles ce jour par des montagnes remplies de roches ou il falloit passer par des ruisseaux profonds, par des endroits maricageux et remplis de Smilax horriblement épineuses qui enveloppoient continuellement le visage, le corps ou les jambes. Je vis au long de la riv. des plaines d'une grande fertilité. En trois endroits différents, les sauvages me montrèrent les situations de 3 villes abandonnées dont ils me dirent les noms.

Le 13 Juin. un peu avant de traverser la riv. Kiwi que nous avions touj. suivi à notre droit en la remontant un des sauvages tua une Dinde sauvage et à 10 heures je trouvay un arbrisseau dioïque dont le fruit est en forme de Poire, calice supérieur à cinq feuil. très courtes ; il n'étoit

pas formé encore, mais il étoit assez avancé po. reconnoître intérieurement un noyau. Je dis que cet arbriss. est dioiq. parceque je vis plusi. des ces arbriss. dont les fleurs étoient passées aux quels il ne restoit que la grappe. Les individus ♀ portoient aussi leurs fruits au nombre de 4 ou 5 sur la même grappe.* Je vis quelques *Magnolia acuminata*, ce fut la 1re fois que je vis cet arbre en Amérique.

Les sauvages tuèrent un Cerf et tandis qu'ils le dépouillèrent, je visitai les torrens ou je reconnus en abondance la *Kalmia latifol.* et le *Rhododendron maximum*.

Cette journée nous avons fait neuf milles et nous étions tous trop affamés po. continuer à marcher, ayant fait une si bonne capture.

Le 14 Juin, nous continuâmes touj. ayant la riv. à droite et alternativement il falloit passer sur des roches ajamber des arbres monstrueux renversés sur des buissons épais et ou à peine on voyoit à se conduire par l'épaisseur des buisse. des hautes montagnes rapprochées et de l'obscurité que produisoit en ce lieu un temps sombre et des brouillars qui me paroisoient une nuit profonde nous envelopper. Le trouble et la confusion étoient augmentés par le bruit des chutes des eaux de cette riv. sur les roches et celui de plusi. torrens qu'il falloit franchir jusqu'aux genoux. La rapidité av. laq. les deux sauvages traversoient les torrens, tantot dans l'eau, tantot sur des arbres qui nuisoient à notre passage, parceque le jeune homme et moi ayant des chevaux à conduire, nous obligeoit d'abandonner nos chevaux po. courir l'un de nous, apres eux et sçavoir ce qu'ils étoient devenus, car il n'y a dans ces lieux d'autres passages que ceux frayés par les Ours et q. quefois par des Sauvages. A l'inquiétude continuelle de marcher sur des serpents j'éprouvois des redoublemens d'une frayeur horrible lorsqu'il falloit passer sur des gros arbres qui se trouvoient si pourris qu'ils manquoient sous les pieds et l'on étoit enseveli à demi dans l'écorce et les herbes qui les environnent. Enfin arrivés à un endroit ou la rivière n'avoit pas plus d'un pied et demi de profondeur sur un glacis de roches, nous la traversâmes et je reconnus le *Pinus Strobus* sur les bords, le Sapin ou Sapinette † aff. & ff. un nouveau *Magnolia* que je nomme *Magnolia* (hastata ‡). Une grande *Aristolochia scandens* §. Nous arrivâmes enfin au lieu ou la rivière Kiwi commence son lit. Cet endroit ressemble à une baie, étant une Plaine de plus d'un mille environnée de plus hautes montagnes, extremt rapides et le contour étant très régulier. Nous y restâmes plus de deux heures po. reposer nos chevaux et manger des fraises qui s'y trouvent en abondance. Notre journée fut de dix milles et la pluye nous obligea de camper sous une cabane d'écorce d'arbre abandonnée des sauvages qui étoient venus chasser en ce lieu, ce que nous

* *Pyrrularia oleifera*, Gray.—C. S. S.

† Michaux's Sapinette may well have been the Carolina Hemlock (*Teuga Caroliniana*), which, however, he never distinguished. It is common in all this region.—C. S. S.

‡ *Magnolia Fraseri*, discovered by William Bartram in the same region 12 years earlier.—C. S. S.

§ *A. Siphon*, L'Her.—C. S. S.

reconnues par les ossements des animaux qu'ils avoient tués et mangés et les échaffauds qui leur avoient servi à faire boncanner la viande.

Le 15 Juin, les sauvages nous conduisirent par des montagnes hautes mais peu dangereuse po. les chevaux et malgré une pluye continuelle, nous arrivames sur les hauteurs de la riv. Tugelo. Je reconnus dans plusi. torrents une nouvelle espece de *Clethra** très grand et la tige de quatre pouces de grosseur en circonference, une violette, dont j'eus le bonheur de recueillir q. ques semences, à feull. hastées. Je vis très fréquemment la *Magnolia* (*hastata*) q. q. plantes nouvelles dont la fl. étant passée, je ne pus déterminer le genre. Notre marche fut environ de 12 milles et peut-être davantage et nous campames à quatre heures entre des montagnes si profondes qu' à peine on voyoit le jour.

Le 16 Juin, nous traversames plusi. montagnes dont les torrents (ou Creeks) se perdent dans la rivière Tenasee et ne trouvant dans ces lieux que le *Magn. hastata* et un *Vaccinium* † (ou *Arbutus*) nouveau dont les ours sont très friands, ce que les sauvages me firent remarquer par les débris de leur digestion. Je résolus malgré la pluye qui continuoit depuis 3 jours d'aller jusqu' à la riv. Tenasee en évitant toutes les branches qui forment cette riv. et nous fimes environ dix huit milles cette journée. Nous campames près la rivière qui en cet endroit coule dans les roches qui la divisent en trois ou quatre parties de manière que l'on peut la traverser sur les roches, mais au dessus et a dessous, la largeur est d'environ 60 pieds. Je trouvay en abondance cet arbriss. dont le fruit est Pyriforme et un *Azalea* à fl. jaunes.

Le Dimanche 17 le jeune homme qui entendoit un peu la langue des sauvages, me dit qu'ils ne reconnoissoient pas eux-mêmes le chemin et qu'il étoit impossible de continuer dans les montagnes traversées par cette riv. Nous résolumes d'aller dans q. que. villes des sauvages pour acheter de la farine, car nous étions las de ne manger que de la viande sans pain. Ayant trouvé heureusement la sentier des (Traders) M^{ds}. qui font le commerce des peaux, nous résolumes de revenir et nous passames sur des montag. qui n'étoient nullement escarpées, touj. remplies de cet *Arbutus* des ours. Notre marche fut de 15 milles. Nous eumes po. la première fois beau temps et la clarté de l'air produisoit sur certaines montag. des Aspects charmants.

Le 18 notre marche fut de vingt sept milles par une pays assez uni et facile à l'exception de q. ques torrents q. les pluyes précédentes avoient grossis. Nous passames dans un village sauvage composé d'environ 60 familles et nous arrivames le soir à Seneca, rendu de fatigues. Cinq milles avant d'arriver à Seneca, je reconnus le *Magn. acuminata* sur le bord d'un torrent appelé Cane Creek.

Le 19 Juin je me reposai et me préparay à partir po. Charleston car il avoit justement deux mois que j'en étois parti.

* *C. acuminata*, Mich., probably discovered at this time —C. S. S.

† Probably *Vaccinium erythrocarpum*, Mich. The very juicy, abundant fruit of this species is greedily devoured by bears.—C. S. S.

Je recueillis en herbier le *Zanthorhiza* et je remarquai derrière la maison du Colonel Henderson beaucoup d'*Annona*.

Non seulement j'eus le désagrément de trouver peu de plantes nouvelles dans ces montagnes, en comparaison de celles recueillies précédemment dans la Georgie, mais je ne vis pas un seul oiseau intéressant. Les rochers que l'on voit dans les montagnes sont composés de Quartz, et l'on trouve du Granit composé de Quartz, de mica et d'une argille ferrugineuse. Dans la partie des montagnes qui appartient aux sauvages le terrain est toujours meilleur de plus en plus. Dix milles au de là de la riv. Kiwi, la ligne de séparation a été tirée entre cette nation et l'Etat de Carol. méridionale mais plusieurs villages se sont éloignés et je vis les vestiges de cinq villes dans le peu d'étendue de pays que je visitay. Cette nation est une des plus nombreuses après celles des Creeks qui habitent l'étendue de pays situé entre la Georgie et l'Ohio. J'appris à mon retour la nouvelle des hostilités commencées entre la nation Creek et les Georgians. Les habitants qui demeurent dans les campagnes aux environs de Seneca, s'étoient assemblés pour construire un fort et s'y retirer. On craignoit que les Cherokees qui n'ont point de chef chez eux que ceux qui gouvernent chaque village, ne se joignissent aux Creeks.

Le 20. je partis de Seneca pour Charleston, notre marche fut de vingt deux milles.

Le 21 notre marche fut de vingt milles par le même chemin que nous avons fait précédemment.

Le 22 notre marche fut de cinq milles ayant eu un de nos chevaux égaré pendant toute la matinée et nous vinmes coucher chez le général Pickens.*

Le 23 notre même cheval fut encore égaré et nous partimes de la maison du Général pour venir coucher à 3 milles seulement (espère d'arriver avant le 10 prochain, à Charleston).

Le Dimanche 24 nous vinmes coucher à Hard Labour Creek 14 milles de marche par un chemin nouveau au travers des bois; Vu plusieurs *Magnolia acuminata*.

Le 25 nous avons fait dix-sept milles en passant par Turkey Creek.

Le 26 nous avons fait neuf milles et nous avons été surpris par un orage.

Le 27 nous avons fait dix neuf milles et nous avons quitté les collines dont le sol est argilleux et les roches de quartz.

Le 28 nous avons fait vingt et un milles dans un terrain uni sablonneux et sans eau. Nous avons campé près de plusieurs sources d'eau où l'on trouve la *Sarracenia tubifolia*.

Le 29 nous avons fait onze milles par un terrain sablonneux et humide; rencontré souvent la *Sarracenia tubif.* et le *Cupressus disticha*.

Le 30 nous avons fait 15 milles, la pluie fut continuelle et nous vinmes camper à un mille de distance de la rivière Eddisto.

* La Capit. Vedle me promit de me fournir des Dindons sauvages en prévenant tous les habitants du District.

Le Dimanche, premier Juillet nous avons fait seize M. Je vis au long de la rivière des swamps remplis de Cyprès et de Nyssa, elles sont près de la route d'Augusta et abondent tellem. en jeunes plantes q. je résolu de revenir l'hyver prochain, la distance n'étant que de 80 à 100 milles de Charleston.

Le 2 nous avons fait dix huit milles.

Le 3 nous avons fait seize milles.

Le 4 nous avons fait vingt un milles.

Le 5 nous avons fait dix milles et nous arrivames a l'habitation.

Le 6 j'arrivai a Charleston et je fis dix milles.

Le 7 Juillet 1787 je visitay l'habitation et les ouvrages du jardinier.

Le 12, 13, 14 et 15 Juillet je fus obliger de rester à Charleston pour terminer les affaires concernant l'acquisition du terrain pour le Roy en Caroline. Je me préparai aussi au voyage de New-York et je fus obligé de m'embarquer sur le paquebot de Philadelphie.

Le 16. Je m'embarquai.

Le 27 au soir, la navire entra à Philadelphie.

Le 27 Juillet arrivé au soir Philadelphie.

Le 28 Visité le consul de France.

Le Dimanche 29 occupé à écrire.

Le 30 voyagé chez Bartram,* et diné chez le consul.

Le 31 voyagé par le stage à New-York.

Le 1er Aoust arrivé à l'établissement du Roy dans le nouveau Jersey.

Le 2 arrivé à New-York.

Le 3 occupé à faire la liste des graines apportées de Caroline.

Le 4 diné chez le chargé d'affaires de France et * * *

Le Dimanche 5, Visité l'Etablissement du Roy avec M. Roland ingénieur de la marine.

Le 6 passée la journée à New-York po. y recevoir de l'argent et compté avec M. Delaforest.

Le 7 visité le jardin et fait le relevé des arbres fruitiers et des arbres américains pour les envoyer en France.

Le 8 emballé mes livres et herbiers p. les envoyer en Caroline, compté et payé le jardinier.

Le 9 écrit à M. le Comte d'Angiviller, M. l'abbé Nolin à M. Le Mounier, M. Chouin (à M. Desaint po. lui annoncer traite de 1200 a l'ordre de M. Delaforest).

Le 10 parti de New-York et * * *

Le 11 arrivé à Philadelphie et le même jour embarqué po. Charleston, le même jour tiré sur M. Dutartre pour la s^e de trois mille livres à l'ordre de M. De Marbois Consul de France à Philadelphie.

* It is probable that this was not Michaux's first visit to the Botanical Gardens, founded by John Bartram, and continued by his son, William. A first visit to this famous establishment could hardly have been made without a fuller entry in the Journal; and Michaux would naturally have sought the advice of William Bartram, who, twelve years earlier, had reached the headwaters of the Tennessee river from the Atlantic seaboard, before undertaking the journey he has just described.—C. S. S.

Le Dimanche 12 passé devant Chester.

Le Dimanche 19 nous dépassames le cap. Hatteras.

Le 20 nous éprouvames le vent du N. O. si considérable que vers le soir l'on aména toutes les voiles et mêmes les vergues supérieures des deux mats ; nous éprouvames pendant la nuit une pluye presq. continuelle, accompagnée de tonnerre, éclairs et vents furieux.

Le 23 et 24 nous eûmes des Calmes.

Le 24 à cinq heures du matin le thermom. exposé à l'air marquait 21 $\frac{3}{4}$ deg. de Reaumer, l'eau de la mer marquoit 21 D, Temps très calme. Led. jo. a midy 23 D. Led. jour au soir 18.

Le Dimanche 26. calme de m. q. les jours précédents. A 3 heures apremidy il s'éleva une brise et nous eumes espérance de hater notre voyage.

Le 27 vents variables.

Le 28 Aoust arrivé à Charleston ayant été dix-huit jours de Philadelphie à Charleston.

Le 29 reçu avis de l'arrivé des * * * caisses d'arbres envoyées par le Capt. Clark le * * * et arrivées à Bordeaux le 20 May ; le même jour écrit à M. le Comte Dangivill. po. lui annoncer la traite sur M. Dutartre. Ecrit à l'Abbé Nolin. Ecrit à M. Marbois. Ecrit à Saunier.

Le 30 continué à écrire et fait plus. visites.

Le 31 reçu des visites, et le soir parti po. la Plantation.

Le 1er Septembre sejourné, enregistré les différentes récoltes faites par mon fils.

Le Dimanche 2, acheté un cheval.

Le 3 herborisé aux environs de la Plantation et greffé.

Le 4 et 5 voyagé au de là de la riv. Cooper po. reconnoitre les Palmiers, trouvé le Sideroxylon tomox. Ligustrum monospermum, et Magnolia grandiflora en abondance.

Le 5 acheté 7 moutons po. avoir du fumier po. le jardin.

Le 6 semé dans le jardin des graines de lauriers * * * aestivalis,* &c.

Le 7 semé plusieurs graines différentes, séché et visité toutes les graines recueillies.

Le 8 labouré et semé.

Le 9. semé.

Le 10. allé à Charleston. j'ay loué une autre chambre, j'ay reçu des lettres de New-York, j'ai écrit à Philadelphia.

Le 11 * * *

Le 12 j'ay retiré des caisses venues de New-York et je suis retourné à la Plantation.

Le 13 recueilli semences de Gledit. triacanthos et commencé la construction d'un grenier po. les semences.

Le 14 recueilli Cassia chamaecrista et Cassia nictitans, Cacalia atriplic.

Le 15 semé des graines.

* A word is here made illegible by the cutting away of the margin of the paper.— C. S. S.

Le 16 semé.

Le 17 préparé une caisse de semences po. envoyer en France.

Le 18 j'ay été à Charleston.

Le 19 revenu à la Plantation.

Le 20 fait labourer.

Le 21 et 22 semé des graines de Caroline.

Le 24, 25, 26 j'ay été à la ville. Envoyé deux caisses de sem. pour Bordenaux. Ecrit à M. Dangiv. M. l'abbé N. Le Mounier Th. M. Nairac et a * * * fait embarquer les 8 canards.

Le 27 et le 28 occupé à la Plantation.

Le 29 et 30 j'ay été avec mon fils à la récolte des *Sideroxylon tomaz* sur Cooper River.

Le 1er et deux Octobre j'ay été avec mon fils au de la de Dorchester à la récolte du *Gleditsia aquatica*.

Le 3 dud. j'ay été à Charleston.

Le 4 j'ay été avec mon fils et un nègre recueillir des *Magnolia grandiflora* au de là de la riv. Cooper.

Le 5 et 6, labouré et semé des graines.

Le 7 recueilli une grande quantité.

Le 8 envoyé mon fils à Charleston et reçu des lettres par la voie de New York de M. Dangivill. de M. l'Abbé Nolin.

Du 8 au 15, envoyé mon fils à la récolte des *Magnol. grandif. Cyrilla, Juniperus, Quercus phellos, Liriodendron*, et moi à extraire journal de mes dépenses.

Depuis le 18 jusqu' au 30 les fièvres ont continué à mon fils et moi, j'ay été incommodé de Rhumatisme.

Du 25 au 31 visité les semences recueillies et préparé un envoy.

Du 1er Novembre jusqu' au 4, continué à remplir les caisses de graines.

Le 30 Oct.*

Le 6 Novembre je restay à la ville po. écrire les lettres, faire l'envoy composé de 7 caisses de graines et une cage de huit canards d'Eté.

Der 7. 8. 9. 10. 11 et 12. occupé à l'envoy cy-dessus et à écrire des lettres.

Le 12 observé dans le jardin de Watson un *Crinum rubrum* dit on originaire du Mississippi. Spathe 2-phylle, deux à 3 fleurs. Corolle tubulée et à 6 divisions. Une Plante à fl. aggrégés Cal. * * * Cor. tubulée. 5 Etam. insérées sur la Coroll. Pist. Stigm. simple Caps. velue à une seule semence.

Du 13 au 14 visité les graines et payé les neg. occupé les jours précédents à recueillir les graines.

Du 15 au 16 passé au de la de Cooper riv. po. l'*Olea americana*.

Le 18 et 19 j'ay été à la ville po. recevoir une caisse d'arbres de New-York.

*The entries made in the Journal on this and the six following days are confined to readings of the thermometer.—C. S. S.

Le 20 j'ay été occupé jusqu' au 28 à planter les arbres et à semer plus. espèces de graines.

Le 29 et 30 voyage a Monks corner po. l'Olea americana et Sarracenia tubifolia.

Le 1er Décembre, planté les arbres rapportés et occupé à préparer l'emplacement d'une cloture po. les cerfs nains.

Le 2 visité les graines et préparé un envoy de graines.

Le 12 remis l'Envoy au paquebot de New-York.

Le 15 Decembre voyagé dans l'interieur de la Caroline pour les Gleditsia monosperme, Stewartia &c., afin d'avoir un envoy complet pour un navire annoncé directemt de Charleston po. le Havre de Grace. Depuis ce jour jusqu' au 27 Décembre occupé à arracher les arbres, les encaisser, et à l'envoy des graines, à écrire les lettres &- &-.

Le 27 dud. remis les caisses et les canards d'Eté au navire destiné pour le Havre de Grace et recommandé à Mr Limousin, négociant.

Le 28 Decemb. 1787. J'ai travaillé à faire le compte de mes depenses et réglé les comptes avec les personnes et les ouvriers à qui je dois de l'argent.

3RD. CAHIER 1788.

JOURNAL.

Le Jedy 14 fevrier 1788. je me suis préparé à m'embarquer. J'ai acheté un petit negre au prix de cinquante pounds et j'en ai loué un autre po. un shill. par jour. Embarqué à midy et demi po. snt Augustine en Florida.

Le 15 Temps calme et vent contraire ; nous avons resté à l'ancre en dedans de la Barre de Charleston.

Le 16 il s'éleva dans la nuit un vent considérable, plusieurs navires chassèrent sur leurs ancrs. Une goelette vint donner contre celle ou nous étions embarqué, mais sans aucun dommage. On parvint à les dégager. Il survint de la pluye, on espéroit qui le vent tourneroit du sud au Nord, mais il continua et le soir nous allames nous mettre à l'abri du vent au dessous de l'isle de Sullivan en vue de Charleston

Le Dimanche 17 fevrier 1788 nous restames à l'ancre et j'allay herboriser sur l'isle de Sullivan. Je ne reconnus que peu de plantes dignes d'être remarquées, parceque cette petite isle, dailleus assez stérile à cause de son exposition aux Vents est incendiée tous les ans selon la coutume des Ameriquains qui mettent annuellement le feu dans toutes les forets. Les Anglois, pendant la dernière guerre ont coupé tous les grandes Chamærops; il n'y en reste que des jeunes qui ne fructifient pas; je remarquai un arbrisseau dont la fructification indique être un Croton et un gramen.

Le 18 le vent se calma mais il ne fut pas favorable.

Le 19 on leva l'ancre et nous dépassâmes la Barre, mais le vent contraire nous obligea de rentrer.

Le 20 on envoya un Cannot à la ville et je profitay de l'occasion. J'y

allay tant pour renouvel, les provis. consumeés pendt le malheureux séjour des vents contraires que dans l'espérance d'y trouver des nouvelles de France par la voie de New-York qui devoient être arrivées. Il se trouva un schooner destiné po. New-York et je regrettay d'autant plus amèrement les huit jours perdus par les vents contraires, que si je fusse resté en Carol. j'y aurois executé un envoy pour le 24 fevrier auquel étoit fixé le départ de ce schooner et de même si le vent eut été assez favorable po. aller à Snt August. j'aurois pu faire un envoy très intéressant par ce schooner, dont le départ étant fixé au 24 fevrier de Charleston auroit pu arriver aisement avant le 10 Mars suivant po. la départ d'un paquebot de France.

Le 21 nous restames encore à l'ancre et sur le soir il s'éleva un vent considérable accompagné de pluye.

Le 22 l'agitation de la mer et le vent étant cessés, nous eumes l'espérance d'avoir le Vent du Nord qui nous devoit être favorable.

Le 23 le vent fut très favorable, mais toute la journée fut employée à retirer une ancre qui se trouvoit tellement engagé que l'on resolut plusi. fois de l'abandonner, mais sur le soir, par le secours d'un autre batiment dont la force étoit superieure on parvint à la retirer.

Le Dimanche 24 fevrier 1788, nous mimes à la voile avec un vent très foible, mais assez favorable.

Le 25, nous eûmes un vent du sud qui étoit contraire; il dura ainsi jusqu' au lendemain matin.

Le 26 et le 27. nous restames en mer et enfin vers le soir, nous reconnumes les cotes de la Floride.

Le 28, nous entrames dans le Port Snt Augustine et nous débarquâmes à une heure après midy.

Il vint à bord des officiers du Gouvernement qui demandèrent ce que je venois faire et si j'avois apporté des marchandises: Je répondis que je venois uniquement po. observer l'hist. naturelle de la Floride et que j'avois auparavt obtenu la permission de son Excell. le Gouverneur. Aussitot on me dit qu'il falloit aller s'y presenter. Je lui (disais) que je n'avois d'autre objet que l'hist. nat. et que lorsque je serois préparé pour aller visiter les diferentes parties de la contrée, j'en informerois son Excellence et que je lui ferois hommage des Découvertes les plus intéressants.

Il me dit que j'étois le bien venu et que tous les services qu'il pourroit me rendre, il le feroit. Il me fit beaucoup d'honnetetés et envoya ensuite dire à l'endroit ou j'avois pris mon logement que l'on ait beaucoup d'attentions.

Le 29, la journée se passa en visites.

Le 1er Mars 1788, j'allay faire un herborisation et je reconnus un Andromeda de nouvelle espèce No. 1, 2 & 3.

Le Dimanche 2, nous allames à l'Eglise et nous entendimes la Messe à laquelle fut présent son Excellence le Gouverneur.

Le 3 Thermometre à 9 Deg. de Reaumur à 6 h. du matin, audessus de 0. Nous allames à 5 milles de distance, mais un orage accompagné de tonnerre

et d'éclairs, nous perça et nous baigna entièrement, et nous ramena sans rapporter aucune plante int' ressante.

Le 4, le vent accompagné de pluie dura toute la nuit, le therm. fut à 5½ d. la tempete fut un peu moins violente pendant la journée; nous allâmes à plus de 6 milles de distance et nous ne vîmes que les arbriss. intéressants trouvés le 1er Mars savoir No. 2 et No. 3. Je recueillis aussi un arbrisseau inconnu qui avoit le port d'un Andromeda No. 4 mais qui en différoit totalement par la fructification.

Le 5 Vent du N. O. Th. 2½ dès le matin, au dessus de 0. La journée employée à lire la description de la Floride et à vérifier cette description avec une carte qui me fut prêtée.

Le 6 consulté plusi. habitans sur les moyens d'aller faire une herborisation au sud de la Province.

Le 7 j'achetay un canot et loué deux hommes pour la manoeuvre.

Le 8 acheté les provisions pour le voyage et beaucoup de poudre et de plomb afin de tuer du gibier, car les parties que je me disposois à visiter sont inhabitées, et seulement fréquentées par les sauvages.

Le 9 Dimanche réglé toutes choses pour le voyage. Thermometre le matin à 5 deg.

Le 10. Th. le mat. à 5 D. ¼. Vent du N. O.

Un ouvrier fut occupé à coudre la voile du canot et à faire q. ques réparations.

Le 11. Therm. le matin à 4 Deg. ¾ au dessus de 0. Vent du N. O. La voile et autres fournitures du canot n'étant pas préparées, j'allay visiter le terrain d'un particulier po. y établir un dépôt d'arbres.

Le mercredi 12 nous partîmes de Snt Augustin dans le canot qui contenoit cinq personnes savoir mon fils & moi, deux rameurs et le negre que j'avois ammené de Charleston. Le vent étoit favorable, mais la marée contraire formoit des vagues qui entroient dans le canot et nous résolûmes de nous arrêter à la maison d'un respectable vieillard établi depuis 52 ans. sur l'isle de Snte Anastasie. Cet homme le plus laborieux et le plus industrieux de toute la Floride avoit rendu son séjour un Paradis non obstant les differents pillages des Corsaires auxquels il a été exposé êt les révolutions qu'il a éprouvées deux fois par le changement de domination, cette Province ayant passé depuis son séjour au pouvoir des Anglois et de nouveau au pouvoir des Espagnols.

Therm. le mat. à 12 Deg.

Le 13 nous cotoyâmes l'isle de Snte Anastasia; nous nous arrêtamés à environ 14 milles de distance de Snt. Augustin et je reconnus sur la rive deux espèces d'arbres * * * appelés par les Anglois Mangrove* et sur q. ques parties de cette isle, le Zamia.

Nous arrivâmes le soir au fort Matansé situé sur cette isle. J'employai le peu d'heures qui me restoit à herboriser à peu de distance de ce fort.

* Rhizophora Mangle; not included in Michaux's Flora.—C. S. S.

Le 14 nous essayames de passer la barre de Matança* distante de 20 M. de Snt Aug., ou se termine l'isle de Snte Anastasia, mais le vent qui venoit de la mer formoit des vagues qui emplissoient le canot ; nous résolumes de nous arrêter chez un Particulier Minorquain qui demouroit à 3 milles de distance sur l'emb. de N. West river et à 24 milles de distance de Snt. Augustin.

Therm. 14 Deg.

Le 15 le vent toujours venant de la mer nous retint a l'habitation du Minorquain. Je visitai les environs et je ne reconnus que la plupart des productions de la Carol. et de la Georgie. sçavoir : Magn. grandiflo. Quercus phellos, Pinus taeda, Myrica cerifera, Bign. sempervir. Juglans hiccory.

Le Dimanche 16 Mars, therm. le matin à 14 Deg. Nous avons pris un cheval et un guide pour remonter la rivière du Nord appelée N. West river. Nous avons fait 23 milles et remarqué seulmt. outre les productions communes de la Carol. et de la Georgie, tels que le Magn. grandiflora, Gordonia lasianthus, Acer rubrum, Laurus borbonia, Cup. distic. Myrica cerifera &c &c. Outre ces arb. je vis au long de cette rivi. qui ne doit être nommée qu'un ruisseau, Andromeda arborea, Zamia pumila Chamærops repens et un arbuste legumineux à feuell. ternées † No. 17 et un autre arbriss. inconnu. No. 18., un Halesia tetraptera à petites fl. deux espèces d'Annona &c.

Le 17. nous suivimes toujours cette rivière, à peu de distance je vis le Viburnum cassinoides, Ziziphus scandens, ‡ Lupinus pilosus flore ceruleo.

Je recueillis beaucoup de semence de l'arbuste No. 17 et un nouvel And. Enfin voyant un sol touj. aride sans productions intéressantes je pris le parti de retourner sur mes pas.

Le 18 je ne recueillis aucune nouvelle plante, mais je reconnus au bord de N. West river et au long de la Rivière de Matanse un Andromeda à f. d'amand. d'environ 10 à 12 pieds de haut, il formoit des tiges creuses et très droites dont les Indiens, dit-on, se servent pour leurs Calumets. Je ne le vis pas en fleur, mais je crois qu'il est celui que Bartram m'a désigné sous le nom d'Andromeda formosissima. §

Le 19 les deux rameurs que j'avois envoyé avec mon nègre, n'ayant point donné le signal dont ils étoient convenu avec nous, je résolus d'aller sur le lieu & j'appris par un soldat du Fort Matança qu'ils avoient trouvé le vent favorable po. passer la Barre et que le marée les avoit obligé de partir sans avoir eu le temps d'allumer du feu po. faire le signal convenu. En revenant je visitai un lieu abondant en oranges à 2 m. de dist. & j'y trouvai plus. arbriss. intéressants.

Le 20, le Mahonois chez qui nous étions logé, me donna trois chevaux

* Matansas Inlet. —C. S. S.

† Perhaps *Erythrina herbacea*, L. —C. S. S.

‡ *Berchemis volubilis*, D C. —C. S. S.

§ *Leucothoe acuminata*, Don. In the Flora, Michaux calls it *Andromeda laurina*. —C. S. S.

po. aller rejoindre nos Rameurs. parceque la Mer est si houleuse sur la Barre de Matança qu'il auroit été imprudent de la passer avec notre Bagage.

Nous partîmes à 7 heures et nous marchâmes jusqu' à 6 heures du soir sans nous arrêter. Je vis le pays le plus aride de la Floride, dans toute cette marche, à l'exception d'une Plantation ou nous arrivâmes à 5 heures du soir, qui avoit appartenu au Gouverneur Moultrie dans le temps q. les Angl. possédoient la Floride. Enfin à 6 heures nous arrivâmes à l'embouchure de Tomoco Creek et nous campâmes sur le Bord du Lagoon (c'est un canal formé par des Isles qui se prolongent sur la cote d'Amériq.) Lorsque ces Isles sont interrompues alors la Mer vient briser sur le rivage et la navigation pour des Bateaux est dangereuse lorsque le Vent vient de la Mer. On peut naviguer avec des petits Bateaux depuis la Caroline jusqu' au cap. de la Floride et cette Navigation s'appelle Navigation de l'Interieur (*inland navigation*) et les differents bras de la Mer formés par les Isles qui se prolongent ainsi se nomment Lagoons qui prennent differents noms selon les lieux et les Isles qui les resserrent. Nous tirâmes un coup de fusil et nos rameurs nous répondirent aussitôt par un autre coup de fusil. Ils y étoient arrivés la veille sans autre danger que celui d'avoir eu deux fois le canot renversé par les vagues et d'être ainsi baigné, mais ils étoient très expérimentés.

Nous étions alors à environ 40 milles de distance de S^{nc} Augusta en ligne droite.*

Le 21 nous passâmes sur la rive gauche de ce Lagoon ou il y avoit une habitation abandonnée. Je vis des Orangers chargés de fruit et j'y recueillis plusi. arbriss. intéressants. Nous vinmes le soir camper à l'Isle des Orangers à 4 milles de distance de l'habitation de M. Penman mais qui étoit abandonnée. Dans l'intervale, nous visitâmes plusi. habitations qui étoient abandonnées et qui étoient assez considérables pour avoir été nommés un Village.

Le 22 nous essayâmes une pluye considérable qui avoit commencé pendant la nuit et qui dura jusqu' à midy.

Notre navigation fut de 6 milles environ et nous campâmes sur la terre ferme à 4 Milles de distance avant d'arriver à l'embouchure de Spruce Creek. J'y trouvai le Carica papaya.†

Le Dimanche de Paques, 23, le vent fut assez favorable et nous vinmes camper entre la Barre de New Smyrne et les ruines de cette ville qui y avoit été fondée du temps des Anglois. Cet établissement avoit été conduit par le Docteur Turnbull aux frais d'une Compagnie dont il étoit le Régisseur. Plus de 1200 personnes, hommes femmes et enfants, la plupart de Minorque, avoient été séduits et ammenés de leur patrie. La dureté et le Despotisme oriental avec lesquels ce barbare conduisoit sa Colonie, faisoit encore le sujet du conversation des habitans de S^{nc} Augustin pendant le temps que j'y fus. Ce lieu est désigné dans une Nouvelle Carte

* Et un mille de l'embouchure du Tomoco Creek.

† Early introduced from the West Indies into Florida by the Spaniards —C. S. S.

de la Floride publiée à Londres depuis q ques années par le nom de *Musketo shore* (côte des mosquitos).

Le 24 thermometre de Rheaum. à 7 Deg. au dessus de zéro, Vent de N. O. très sensible.

Nous vinmes camper sur les ruines de New Smyrne, j'y remarq. plus de 400 Maisons détruites. il n'en restoit que les cheminées parceque les Sauvages qui vient. visiter ce lieu pour les Orangers qui y subsistent touj. malgré leurs incendies annuelles détruisit aussi les boiseries dont ces maisons sont composées pour se chauffer.

Le 25 Th. a 5 Deg : gelée blanche. je visitay les lieux humides et les environs de cet Etablissement qui avoit été très florissant du temps des Angl. ; mais je n'y remarquay d'autres plantes que celles qui m'avoient interessé les jo. précédents. Nous étions alors à 75 M. de S^t Augustin.

Le 26 notre navigat. fut de 12 Milles et nous nous arretames sur les ruines d'une Plantation qui avoit appartenu au capit. Besy, dans un lieu très fertile qui me donnoit envie d'en visiter les Swamps.

J'y trouvay seulement une espèce de *Panocratium* et une Plante annuelle de 12 pi. de haut dessech. dont je recueillis q.q. semences.

Le 27 nous navigames touj. entre des Isles de *Mangles*, (*Rhizophora Mangle*) et nous vinmes diner au pied d'une colline nommée *Mont Tucker*. Je recueillis plusieurs arbriss. et pl. des Tropiques. Le soir nous vinmes camper sur les ruines de l'habitation du capit. Roger.

Le 28. je traversay dans les Marécages qui composoient autrefois cette habitat. ou l'on avoit cultivé des Canes à Sucre et enfin sur les midy, nous vinmes la riv. Indienne (*Indian river*) et par q. ques uns *Aisa hacha* c. a. d. rivière des Cerfs et pour les Espagnols *Rio d'Ais*.

Cette habit. étoit la plus merid. que les angl. ayent établi en Floride. Nous allames camper 4 milles plus loin.

Le 29 Mars. notre navigation fut d'environ six milles parceque le vent contraire est tres fort, les rameurs avec beaucoup d'effort faisoient peu de chemin. De plus mon fils et moi nous allions sur la rive occidentale pour tacher de découvrir l'endroit le plus resserré entre la rivière Indienne et le Canal ou nous étions. Sur les onze heures de dessus les arbres on distinguoit aisement les deux Bras de la Mer c. a. d. celui ou nous étions appelé par les Anglois . . . et la Rivière Ind. ainsi nommée par les Angl. qui n'est nullem^t un Riv. mais un Bras de la Mer très resserré comme tous les autres par une chaîne d'Isles qui se prolongent du Nord au Sud depuis la Carol. jusqu' au Cap de la Floride. Nos deux rameurs descendoient à terre et nous parcourumes tout le territoire afin de trouver un passage moins penible po. transport. le Canot. Vers les quatre heures du soir nous revinmes au Camp avec l'espérance de pouvoir transporter le Canot. Nous désirions d'autant plus nous approcher de la terre ferme que depuis notre Départ de la Nouvelle Smyrne nous n'avions que de l'eau saumatre. La provision de Rum po. nos rameurs étoit consommée et ils ne désiroient pas moins quitter ce lieu ou nous étions dévoré des Moustiques. Quant à moi il ne présentoit alternativem^t que des étendues considérables de Jones

et de Palmets* à dents de scie (*Chamærops monosperma fronde acute dentatis radice repente*).

Cependt. je trouvay parmi les arbres qui composoient une partie de Bois situé sur la Riv. Indienne un† figuier à f. oblongues et entières, un nouveau Sophora‡ et deux autres arbriss. inconnus. Cela augmenta mes espérances pour les expéditions q. je me disposois à faire les jo. suivants sur cette Rivière.

Le Dimanche 30 Mars nous avons été occupé toute la journée à rouler notre Canot par terre, l'espace d'un Mille au travers de Joncs et de Broussilles. Il fallut copier des arbres, mais la plus grande difficulté étoit lorsque nous avions à traverser des espaces de cent toises toutes couvertes d'un Chamærops à dent de scie qui non seulem^t coupoient nos Bottes et nos Jambes mais résistoient par la dureté de leurs tiges aux bons instrumens dont nous étions fournis. En effet, un ouvrier très habile que j'avois loué po. ce voyage disoit qu'il aimoit mieux couper un Chou-palmier de 60 pieds de haut qu'un de ces arbriss. parceque la tige qui est rampante est souvent entrelassé d'autres tiges ou branches de la même grosseur qui passent les unes sur les autres. Enfin sur le soir, le Canot fut passé et tout le bagage transporté sur la rive de la Rivière Indienne.

Le 31 Mars. nous étions disposé à partir à la pointe du jour. Mais l'endroit ou nous étions étoit une espèce de Golphe qui (au jugement de nos rameurs) formoient avec la rivière une étendue de six milles de large. Le vent étoit contraire et il y a si peu d'eau dans toute la partie de ce Golphe que notre Canot ne pouvoit avancer quoique mon fils et moi nous ayons fait plus de quatre milles dans l'eau qui ne venoit qu'a mi-jambes. Lorsqu' il y avoit de l'eau trop profondément, nous montions dans le Canot, mais alors les Vagues entroient dans le Canot de sorte que vers midy nous nous arrêtaimes près d'un marécage rempli de Mangliers. Ne pouvant camper sur ce lieu qui étoit une vase très humide, nous retournâmes au lieu d'ou nous étions parti, mais il s'en fallut peu que le Canot ne fut submergé par la quantité d'eau qui y entra de sorte que nos provis. furent toutes mouillées.

Le Mardy 1^{er} Avril 1789 le même vent du Sud qui nous avoit ramené nous retint au même lieu. Il soufla avec plus de violence même q. le jo. précédent Nos rameurs en profiteront po. secher le Ris et le Biscuit qui avoit été tout trempé le jo. précédent. Ils allerent à la pêche et nous rap portèrent deux Poissons qui pesoient plus de 18 livres chaque. J'allay herboriser apres avoir séché mon Bagage qui avoit été aussi submergi la veille et je recueillis le *Pteris lineata*§ et le *Polypodium Scolopendroides*|| qui croissent communément sur la tige des grands Chamærops. Je trouvay aussi l'*Acrostichum aureum* dans les lieux très humides et même parmi

* *Sabal serrulata*, R. & S.—C. S. S.

† *Ficus aurea*, Nutt —C. S. S.

‡ Probably *S. tomentosa*, L. Neither this nor the *Ficus* appear in Michaux's Flora.—C. S. S.

§ *Vittaria lineata*, Michx. (*V. angustifrons*, Swartz).—C. S. S.

|| *Blechnum serrulatum*, Michx.—C. S. S.

les Mangliers qui bordent les marécages immenses de ce fleuve. Nous vinmes des oiseaux aquat. de plusi. espèces et mon fils en tua ce jour plus de 12 d'un coup de fusil à plusi. reprises. Nous coupâmes des Chou. palmiers po. épargner le pain qui diminoit et nous nous mimes à la ration de deux Biscuits par jour pour cinq personnes que nous étions.

Le 2 Avril nous profitames d'un calme pour traverser la rivière du coté de la Terre ferme. Il y avoit au moins six milles de distance et vers midy nous primes terre. Le vent qui s'étoit élevé considerablement empêcha de continuer la route l'apres midy. Je trouvoy sur la Terre ferme en abondance le *Sophora** occidental, bel arbriss. j'en recueillis abondamm^t des graines et un bel épi de ses fleurs me confirma que c'étoit un *Sophora* dont la fleur est très agréable. Je recueillis quelques autres plantes que la nuit m'empêcha de décrire . . . Une nouvelle espece de *Spigelia*, une autre plante qui a affinité avec . . .

Notre marche fut évaluée à douze M.

Le 3 Avril notre marche fut de quinze milles et au lieu de plantes intéressantes et nouvelles qui m'excitoient (dont l'espérance m'excitoit) à surmonter les obstacles, (car je voyageois touj. à pied po. soulager les rameurs qui avoient le vent contraire). Je ne trouvois que des arbres ou arbriss. de la *Georg.* et de la *Carol. Magn. glauca. Gordonia. Acer Rubrum.* Cependant je recueillis deux Annon. l'un d'eux nouvelle espèce avec des fl. blanc. très larges et feuilles † . . . L'étendue de ce Canal qui avoit de 4 à 8 milles de large en plusi. endroits épouvanta nos rameurs et nos rameurs eux mêmes jugerent qu'il étoit plus convenable de profiter de la situation du vent pour revenir de sorte que nous primes la résolution de profiter du calme qui avoit lieu tous les jours avant le lever du soleil jusque vers neuf heures du matiu. En effet le 4 nous étant embarqué avant le jour et le vent favorable, nous eumes le bonheur de avoir traverser le Lit le plus profond avant huit heures et sur le soir nous nous retrouvâmes sur la rive orientale de la rivière Aïsa hatcha.

Tous les soirs nous voyons de notre camp les feux que les sauvages faisoient sur l'autre rive de cette rivière, mais depuis notre départ de S^{nt} Augustin, nous n'en avons pas encore rencontré et nos rameurs nous conseilloyent d'éviter leur visite à cause des importunités aux quelles on est exposé de leur part afin d'avoir du Rum dont ils sont au moins aussi passionné que pouvoient l'être nos Rameurs qui d'ailleurs étoient les plus sobres que j'ai vue en ce genre.

Notre navigation fut évalué à 24 milles.

Le 5 la journée fut toute entière employée à transporter le Canot et à le rouler de la même manière que nous avons fait le Dimanche précédent.

Sur le soir je profitay d'un petit interval de temps pour une collection de plusieurs arbriss. et arbres que j'avois remarqué sur le bord de cette Rivière et que je n'avois pas vu précédemment. Je les emballai de manière

* *S. tomentosa*, L. ?—C. S. S.

† *Perha*; * *Anoma lili-colla*, Dunal.—C. S. S.

à pouvoir les transporter jusqu' à Charleston pour les y planter et tout fut disposé pour retourner à Sst Augustin dès le lendemain.

Le Dimanche 6 Avril avant quitter cette partie la plus Meridionale de la Floride ou j'aye pu m'avancer, je ré-olus de visiter une Isle ou je voyois des arbres différents de ceux [autres q. des mangles les seuls] qui se trouvent communément sur ces Isles et je ne perdis pas mon temps ayant recueilli la *Guilandina bonduccella*,* le Mangrove à fruits comme ceux du figuier de Catesby . . .

Un arbre inconnu et un Phaseol ou Dolichos à gros fruits.

Notre navigation fut de . . . et nous vinmes camper sur les ruines de l'habitation du capit. Roger. Cette habitat. étoit la plus méridionale que les Angl. ayent eu en Floride. On y avoit cultivé du sucre, mais les sauvages ont détruit toutes les Canes.

Le 7, le vent qui souffloit du sud depuis plusi. jo. et qui nous étoit très favorable po. le retour, nous poussa jusqu' à la Nouvelle Smyrne dont il n'y a plus q. des Ruines comme je l'ay déjà remarqué. Notre navigat. fut de . . .

Le 8 nous vinmes coucher sur une Isle à dix mille de distance de . . .

Nous étions sous la latitude de . . .

Le 9. nous eumes le vent en poupe et malgré les différentes relaches notre navigation fut de vingt quatre Milles.

Nous vinmes camper à l'embouchure de Tomoko Creek, latitude de . . .

Le 10 Nous montames la rivière de Tomoko qui est véritablement une Riv. bien qu'elle soit nommée Creek par les Anglois qui ont eux mêmes bien peu connu la Floride dans le temps qu'ils en étoient en possession. Le Vent se trouva très favorable et nous trouvâmes sur le soir une Isle couverte de bois. Nous campames un peu au dessus et notre navigat. fut d'environ 18 milles tout au plus.

Je recueillis un *Annona* † à grandes fleurs blanches que je crois *Annona palustris* et *Annona glabra* qui me paroît une variété du triloba. Les productions qui se trouvent sur cette riv. sont : *Acer rubrum*, *Cupr. disticha*, *Fraxinus* . . . *Magn. grandiflora* et *glauca*, *Pinus foliis binis*.

Le 11 nous montames environ cinq miles et la rivière qui étoit remplie d'arbres empechoit le Canot de passer de sorte que je résolus de déjeuner en ce lieu, d'y faire une herborisation pendant q. l'on préparoit le déjeuner et d'en partir aussitot après.

Le soir nous revinmes coucher à l'Embouchure de la rivière Tomoko.

Le 12 un homme partit pour aller chercher des chevaux afin de transporter le Bagage qui ne pouvoit être transporté dans le Canot, afin de passer la barre de Matança.

Le Dimanche 13 Avril celui de nos hommes que j'avois envoyé à l'habitation du Mahonois po. avoit des chevaux, arriva sur le soir et il apporta des vivres qui nous manquoient.

J'avois employé le jour précédent et celui-ci à visiter les Bois et les

* *Cesalpinia Bonduc*, Benth. & Hook.—C. S. S.

† *Anona laurifolia*, Dunal; here at its northern station in Florida.—C. S. S.

marécages qui couvrent les environs du lieu où j'étois, mais il ne se présenteoit aucune plante intéressante en ce lieu très désagréable par les Caymans et les Serpents qui abondent et les Mosquitoes dont nous étions tourmentés sans pouvoir reposer pendant la nuit.

Le 14 nous nous mîmes en marche à la pointe du jour et nous n'arrivâmes q. très tard le soir à cause des détours que nous fîmes obligé de prendre à plusieurs tois au travers des Chamærops à dents de scie qui couvrent la surface du sol, car les bois sont très clairs. Nous fumes, dis-je, obligé de prendre un tour considérable parceque les bois avoient été incendiés les jours précédents. Ils brûloient encore et le vent qui venoit à notre rencontre portoit l'incendie avec une rapidité extrême. On n'a pas d'idée en Europe de l'étendue considérable des bois qui sont annuellement incendiés en Amérique soit par les sauvages soit par les habitants Américains eux-mêmes. Ils n'ont d'autre motifs les uns et les autres que d'avoir par ces Incendies de l'herbe nouvelle dépourvue de l'herbe sèche de l'année précédente. Je suis persuadé que c'est la principale cause de dépérissem^t po. chasser pl. aisément les Cerf et po. nourrir des Bestiaux des bois dans toute l'Amérique septentrionale.*

Le 15 nous attendîmes les rameurs qui étoient allé par Mer passer la Barre de Matança.

J'allay faire une herborisat. dans les bois et je reconnus l'Andromeda que j'avois vu précédemment pour être vraim^t une nouvelle espèce, ayant assez de ressemblance avec l'Andromeda arborea, mais différente à plusieurs égards particulièrement par la disposition de ses fleurs et . . .

Je reconnus aussi un *Anonaf* et la *Stillingia silvatica*. Je recueillis de tous les arbriss. et arb. rares pour compléter une caisse que je me propos. de porter av. moi à Charlest. à tous hazards parce que la saison étoit alors trop avancée.

Le 16 nous partîmes de ce lieu po. revenir à S^{nt} Augustin et nous vinmes camper à deux miles de distance du fort Matança.

Le 17 nous nous mîmes en route à deux heures du Matin et nous arrivâmes à S^{nt} Augustin (le vent étant très favorable) à Midy.

Le 18 j'allay rendre visite au Gouverneur Espagnol et je visitay M^r. Leslie agent pour les affaires des Indiens et pour me concerter avec lui sur les moyens de voyager chez les Indiens.

Le 19 je fus engagé à dîner chez M^r. Leslie.

Le Dimanche 20 Avril je recus la visite du Gouverneur qui vint voir mes Plantes et autres Collections que j'avois recueillis dans mon voyage, en oiseaux &c. Je fus engagé à dîner chez lui et l'après midy se passa dans les jardins de Son Excellence avec les Dames aimables de sa famille.

Le 21, 22 et 23 j'ai fait des herborizations aux environs de S^{nt} Augustin et j'ai envoyé un homme sur la rivière S^{nt} Jean pour retenir un Canot afin d'abrégéer ce voyage en évitant d'y entrer par l'embouchure.

* This deplorable custom is still continued throughout the entire extent of the maritime Pine Belt of the Southern States to the great injury of the forest.—C. S. S.

† *Anonaf*—C. S. S.

Le 24, 25 et 26 j'ay écrit à Mons^r le compte d'Angivill pour lui rendre compte de mon voyage au sud, de mes Récoltes et pour lui annoncer la traite de 2000f. à l'ordre de M^r. De la Forest sur M. Dutartre.

Écrit à M. l'Abbé Nolin pour répod. à sa lettre reçue ici et pour lui marquer les observations sur les Plantes que j'envoye.

De plus je lui ay demandé la Racine de Disette et de la graine de Véronique mâle pour Mr. le capit. Howard. J'ay écrit à M. De la Forest pour lui envoyer les lett. de change sur M. Dutartre par triplicata pour employer les fonds au service de l'établissement près New-York.

J'ay écrit aussi à M. Dr Marbois consul de France à Philadelphie pour lui recommander le paquet à l'Address de Mr. le Cte. d'Angivill.

Cette semaine j'y décrit plusieurs gramens et Carex, Scirpus et autres plantes qui croissent aux environs de S^{nt} Augustin.

Le Dimanche 27 Avril, rédigé les Listes et les Descriptions des Plantes recueillies depuis mon arrivée montant à 40 espèces dont les genres et les espèces me sont bien connues.

Le deuxieme cahier contient 36 dont les genres me sont bien connus, mais les espèces doutantes ou inconnues.

Et le 3^{me} Cahier contient 29 dont la plupart sont inconnues ou ne pouvoient être déterminées faute d'en voir la fleur.

En tout 105 Arbres ou plantes recueillis depuis le 1^{er} Mars jusqu' à ce jour.

Le 28 Avril acheté les provisions et préparé à partir pour aller visiter le lac George au dela de la rivière S^{nt} Jean.

Remis les lettres écrites précédemm^t au capit. Hudson qui devoit partir pour aller à S^{te} Mary prendre son navire et aller à New-York en relachant à Savanah. Écrit par la même occasion à M. Ferry Dumont.

Adressé le paquet à M^r. De la Forest ainsi que les lett. de ch. sur M^r. Dutartre.

Observé sur l'habitation de S^{nt} Roquet en abondance des *Annona grandiflora*.

Le 29 Nous sommes partis pour aller sur la Riv. S^t. John.

Le 30 nous sommes arrivés à l'habitation de M. Wiggin située sur cette riv. à 40 Miles de S^{nt} Augustin par terre.

Le jeudy 1^{er} May 1788, j'ay herborisé aux environs et recueilli en fleur l'Androm. formosissima. Le Canot étant préparé le 2 May, nous nous sommes embarqué et nous avons passé par le Magazin établi pour le commerce av. les Sauvages situé à 10 miles de distance. Nous avons campé plus loin et nous avons fait seize miles de navigation sur cette Riv.

Le 3 May nous avons fait de 14 à 16 Miles ayant touj. le vent contraire et nous avons campé dans un lieu nommé Camp des Indiens, qui paroissoit avoir été cultivé autrefois. J'y reconnus le Sapindus saponaria,* des Orangers et un joli Convolvul. dissectus? &c.

Le Dimanche 4 May nous avons fait quatre miles seulem^t et nous avons

* Probably *S. marginatus*, Willd.—C. S. S.

campé sur une Isle à l'entrée du lac George sur la rive orientale vis à vis un lieu nommé la pointe des Alligators. Le vent qui étoit contraire et très fort nous obligea de rester en ce lieu ou je reconnus l'Erythrina, de nouveau ligneux et le Sapindus Saponaria. Les bois étoient remplis d'Oranges aigres.

Le 5 May, nous vinmes en entrant dans le Lac George une grande Baie profonde à main gauche c. a. d. à l'Ouest et après avoir dirigé notre route au fond, nous rencontrâmes dans une riv. que l'on n'aperçoit pas avant d'y arriver à la distance de vingt toises seulement. L'embouchure (29 D. 5' Lat.) de cette rivière est tellement remplie de sable qu'il fallut trainer le Canot l'espace de vingt cinq à 30 toises. En suite on trouve plus de 15 pieds de profondeur. L'eau en est saumâtre et plus dégoutante que celle de la riv. St Jean et celle du lac G. Après avoir remonté pendant plus de trois miles, nous trouvâmes la source qui sort de terre en formant des Bouillons qui s'élèvent à plus d'un demi pied sur la surface. L'on voit le fond à plus de 30 pi. de profondeur. Au tour du Bassin formé par cette source, nous reconnûmes l'Illicium. Le sol est composé de sable noirci par les débris de végétaux et de Coquillages.

Les autres arbres qui abondent en ce lieu, ainsi q. par tout ou l'on trouve l'Illicium* sont les Magnol. grandiflora et glauca, Ilex cassine, Olea amer. et Laurus Borbonia. Cette rivière abonde en Poiss. si prodigieusement qu'ils se heurtoient contre le Canot à mesure que nous avançons. Notre course fut de cinq miles jusqu'à l'embouchure de cette Rivière.

Le 6 May nous remontâmes en suivant le rivage et comme j'allois sur le sable tandis que le Canot continuoit, je reconnus à un Mille de distance du lieu ou nous étions parti, c. a. d., de l'embouchure de la rivière salée, une source d'eau, la plus pure et la meilleure que j'aye bu cy-devant en Floride. Nous nous y arrêtâmes pour déjeuner, car nous étions tous altéré et dégouté de la mauvaise eau q. nous buvions depuis plusieurs jours. Un mille plus loin je reconnus encore l'Illicium et il se trouva en abondance à la pointe meridionale de la Baye. Apres avoir dépassé la baye (29 Deg. 3' de latitude), nous vinmes camper à la Colline des Oranges pour nous y mettre à l'abri d'un Orage furieux qui alloit fondre sur nous. Au bas de cette Colline est l'Embouchure d'une rivière assez large dont l'eau n'est pas aussi agréable q. celle de la précédente. Je remontai cette riv. environ deux miles et je reconnus dans le bois le Sapindus Saponaria. Une espèce de Coffea qui j'avois observé cy devant à Moskito shore et deux autres arbres que j'y avois vu mais qui m'étoient resté inconnu. Je vis aussi la Crium americanum. Notre course fut évaluée à 15 miles.

Le 7 May 1788, notre navigation fut de huit miles. Nous passâmes le lac George et nous entrâmes dans la Rivière qui est au dessus et nous campâmes dans un Lieu abondant en Orangers. Nous arrivâmes aussi

* This is probably the rare *Illicium parviflorum*, which Michaux found "*justa annem S. Joannis*," but which has not since been found growing wild in North America. It was detected in the Island of Cuba by Charles Wright.—C. S. S.

tot po. construire une Cabane de feuilles des Palmier sauvage Chamœrops . . . pour nous garantir d'un orage.

Le 8 May, notre navigation fut de 10 Miles et nous éprouvâmes un orage plus considérable que celui de jour précédent. Nous vinmes un Lieu fréquenté par les Sauvages. Il y avoit un Canot qui leur appartenoit au bord de la rivière et une Marmite. Je fis mettre quelques Biscuits, des haricots et des Oranges douces dans cette Marmite et nous continuâmes notre chemin. Nous entendîmes tirer deux coups de fusil ce qui prouvoit q. les sauvages étoient à la chasse de ce côté là. Nous passâmes un lieu si abondant en oranges que je fis plus d'un demi mille dans l'intérieur du Bois en largeur sans trouver d'autres arbres. Ce lieu avoit plus d'un Mile de long. Nous sommes venus camper sur une colline ou je reconnus la Rivina humil. un Asclepias arbriss. & &— le Gledisia mont osperma au bas de colline et le sommet couvert d'Orangers.

Le 9 May notre course fut évaluée à 12 miles seulement quoiqu. les Rameurs ayant travaillé toute la journée, mais depuis notre départ avec le courant qui étoit opposé, puisq. nous remontions une rivière, le vent fut toujours contraire. Pendant plus de huit miles, il ne se trouva autre des deux côtés de la riv. que herbes joncs, et peu d'arbres, le sol y étoit touj. bourbeux. La rivière étoit bordée des deux côtés d'Alligators ou Caimans qui avec leur figure horrible étoient d'une grandeur et grosseur énorme. On les approchoit de 6 pi. à 10 pi. de distance. Leur forme escelle d'un Lizard, mais ils sont noirs armés tout le long du dos de grosses pointes qu'ils hérissent quand ils sont en colère. On ne peut les tuer qu'on chargeant le fusil avec des balles et en visant au bas du Cou. Le Nez est plus retroussé que celui d'un cochon la tête aplatie de deux pieds quatre pouces & q. que fois davantage en longueur. Les yeux sont très rapprochés du sommet de la tête. Ils ont soixante douze dents à la Machoire. Ils avalent aisement les Chiens les Cochons et les jeunes Veaux, mais au moind. mouvement d'un homme, ils se précipitent dans l'eau avec un grand fracas. Ils sont amphib. et venoient tous les matins nous rendre visite po. avoir les débris du Poisson dont nous étions bien fournis sur cette rivière. Nous étions régalez aussi de leur Musique dont le bruit ressemble a un Ronflement plus fort et plus continué que le Mugissement du Taureau, situé dans une vallée à un mile de distance. Les sauvages en mangent q.q. fois la partie inférieure, mais seulement lorsqu'ils manquent d'autre gibier.

Le 10 May notre navigation fut de 15 miles ; nous remontâmes jusqu' à la source une rivière qui sortoit de terre. L'eau en étoit saumâtre et rendoit une odeur insupportable, quoique l'on en voyoit le fonds à plus de 15 à 20 pi. de profondeur. Nous eumes beaucoup de difficultés à passer sur des arbres qui couvroient le fonds et q.q. fois embarrassoient la superficie. Il n'y a point eu d'habitations plus reculées du temps de Anglois que celle sur les ruines de la quelle nous avons déjeuné ce même jour. Je trouvay à l'endroit le plus reculé ou nous nous sommes avancé une espèce de colouquite sauvage.

Le Dimanche onze May, nous avons fait onze Miles toujours en remontant vers contre le courant de la Rv. qui paraissoit de plus en plus embarrassée et se perdoit dans des Marais couverts de Joncs. Je recueillis un *Ipomoea** dont la fleur étoit parfaitement blanche et le tube six pouces de long. Cette plante me paroît annuelle et croit aux lieux humides, les feuilles sont entières, cordiformes. Voyant peu de Succès à continuer mon Voyage, je fis rétrograder et nous revinmes coucher au lieu d'où nous étions parti ce même jour.

Le 12 May, le vent étoit favorable à notre retour et nous fîmes vingt-sept Miles. Nous avons campé à la Colline des Orangers.

Le 13 May, le Vent et le Courant furent de même tres favorables & nous arrivames sur le bord du ruisseau dont l'eau étoit si agréable et si belle. Il est situé à un demi mile seulem^t de la rive d'eau saumatre aussi dont l'eau est aussi mauv. q. celle du ruiss. est bonne. J'y éprouvay de plus la satisfact. de recueillir à seulem^t quatre vingt toises de distance l'*Illicium*. Il est à remarquer que cet arbriss. se trouve dans les lieux ou croissent le *Magn. grandif.* *Annona grandif.* *Olea americana*, *Ilex cassine* &c. &c. mais plus particul^r ou l'on trouve aussi l'*Aralia spin.* et un *Gramen* appelé *Canes*† qui croit à dix pieds de haut ce qui indiqu. touj. un bon terrain mais sablonneux et frais. Notre course fut de dix huit à 20 Miles ce jour la.

Le 14 May notre navigation fut de . . . et nous arrivames à l'habitation de S Wigins . . .

Le 15 May nous nous mimes en route par terre pour revenir à S^t Augustin.

Le 16 May, nous arrivâmes à S^t Augustin à deux heures après Midy

Le 17 j'allay rendre visite à son Excell. l Gouverneur &c

Le Dimanche 18 May, je rédigeai mes collections.

Le 19 je fus invité à dîner chez le capit. Howard.

Le 20 et 21 J'allay herboris. a l'extrémité de l'Isle St. Anastasia.

Le 22 jour de la fête de Dieu assisté a la Prossesicon.

Le 23 pris congé de son Exc. le Gouvern^r & de plusi. personn. de distinct. desquelles j'avois reçu un accueil favorable.

Le 24 remis au Governem^t un détail des observations faites en Floride pendant mon séjour.

Le Dimanche 25 May parti de S^{te} Augustin pour le Poste S^t Vincent et nous avons couché à *Twenty-Miles house*.

Le 26, nos chevaux ayant été égarés pendant la nuit, nous les avons cherché le lendemain. Le Sergent de ce Poste qui s'étoit chargé de nos chevaux nous fit conduire par deux Soldats et deux autres chevaux jusqu' au Poste S^t Vincent situé à 40 milles de S^t Augustin.

Le 27 nous nous embarquâmes dans notre Canot qui étoit venu par Mer nous attendre au Poste S^t Vincent parceque nous avions profité d'une petite navire qui falloit voile pour cette partie de la Floride.

* *I. Itona-nor*, L. — C. 8, 8.

† *Arundinaria gigantea*, Chapm. — C. 8 8

Le 28 May 1738, nous navigames entre des Isles de Joncs et nous avons campé vis à vis la Barre de Nassau river.

Le 29 May, nous arrivames à l'embouchure de la riv. S^{nte} Mary qui sépare la Floride de la Georgie et nous avons campé sur le territoire de la Georgie. L'endroit ou nous traversames cette riv. a environ deux milles de large.

Le 30, nous avons cotoyé l'isle de Cumberland qui a plus de . . . miles de long et nous avons campé sur l'isle même. A cause des détours considérables que nous avons été obligé de faire dans le canal qui regne entre la grande terre et cette Isle, nous arrivames à 9 heures du soir au lieu du campement. La partie de la grande terre, en Georgie, vis à vis de cette Isle, se nomme Cambden county.

Nous vimes plusi. habitations sur cette Isle, des habitants de la Georgie qui s'y étoient réfugiés pour éviter les ravages des Indiens Creeks qui avoient détruit leurs bestiaux brulé les maisons et tué beaucoup plusi. d'entre eux.

Le 31 nous avons continué notre route dans le Canal qui se prolonge au long de cette Isle et à onze heures nous avons passé le Sond S^{nt} Ander qui a plus de cinq milles de traverse dans la partie la plus étroite. Plusieurs rivières y ont leur embouchure. Nous avons ensuite continué notre route au long de S^t Simeon Island et à dix heures du soir nous avons traversé le Sond S^t Simeon.

Le Dimanche 1^{er} Juin 1788, nous sommes parti à deux heures du matin et nous arrivames sur les dix heures à Frederictown. Je remis des lettres à differents particuliers et je dinay avec mon fils chez M. Spalding ou il se trouva des dames de la famille du General MacInstosh et plusi. personnes de considération.

Le 2 Juin nous sommes venus jusqua la pointe méridionale de l'Isle nommée Little Saplo Island et nous avons campé apres avois passé le Sond. nommé Frederic sound.

Le 3 Juin nous avons passé deux Sound ou Barres et nous sommes venus camper sur l'Isle S^{nte} Catherine.

Le 4 nous avons passé à 7 heures du matin le Sound S^{nte} Catherine. Le temps étoit calme, la largeur est plus de 4 miles et nous trouvames quatre courants très rapides qui non obstant le calme qui regnoit alors, donna une grande peine à nos rameurs et nous exposoit au danger ou de ne pouv. le vaincre, ou d'être submergé au moindre vent qui se seroit élevé.

Le 5 Juin notre navigation fut évaluée à 23 miles et nous arrivames sur le soir à Savanah.

Le 6 nous avons séjourné à Savanah.

Le 7 nous sommes parti par un Navire qui étoit destiné pour Charleston.

Le Dimanche 8 Juin arrivé à Charleston et j'y ay resté jusqu' au lendemain.

Le 9 j'ay été à l'habitation.

Le 10 j'ay visité le Jardin et les Pépinières.

Le onze j'ay été de nouveau à Charleston pour retirer mes effets du navire et faire transporter les caisses de Plantes à l'habitat.

Le 12, 13 et 14 j'ay planté les arbres rapportés de la Floride.

Le 15 et 16 occupé à semer les graines rapportées de la Floride et une grande quantité d'autres espèces.

Le 17 je fus de nouveau à Charleston.

Le 18, 19 et 20 Juin, les ouvriers de l'habitation ont été occupés à arracher l'herbe dans les Pepinières.

Le 21 herborisé et recolté du *Fothergilla Gardeni*.*

Le Dimanche 22 revenu à l'habitation.

Le 23, 24 et 25 travaillé au jardin.

Le 26 j'ay été à Charleston.

Le 27 je suis revenu à l'habitation.

Le 28, 29 et 30 travaillé au jardin et continué avec plusieurs nègres la récolte du *Fothergilla Gardeni*.*

Le mardy 1^{er} Juillet, la récolte du *Fothergilla gard.* s'est trouvée monter à quatre Boisseaux.

J'ay écrit à M^r le Comte d'Angiviller et j'ay fait un Envoy des Graines de la Floride. J'ay aussi écrit à M. L'Abbé Nolin par M^r Leyritz.

Le 2 je suis revenu de la ville.

Le 3 j'ay été avec mon fils à la recherche du *Stewartia*.

Le 4 Juillet 1788 occupé alternativement au jardin sur l'habitation à differens voyages vers les rivieres Santee et Cooper &- &- . . . Obligé aussi à plusieurs voyages à Charleston jusqu' a la fin de ce mois.

Remarqué à peu de distance de Monk's corner le *Zizania palustris*.

Le 2 Aoust 1788 Remis au capit. Elliot une boite de graines à l'adresse de M. le Comte par la voye de New-York.

Le 3, 4, 5, 6, 7, 8 et 9 dud. occupé sur l'habitation n'ayant pas été content du jardinier précédent.

Le 10 jusqu' au 14 Aoust, voyagé vers Monk's corner et au dela vers Cambden.

Le 15 attaqué de la fièvre.

Le 20 tiré sur M. Dutartre po. le service de l'Etablissement à New-York, une Lettre de Change de 2000 lvs a l'ord. de M^r De la forest Consul de France à New-York.

La fièvre a toujours continué et je pris le parti d'après les avis de plusi. personnes de venir à Charlestou po. être à portée du Medecin et des secours necessaires.

Le 7 Septembre, 1788, n'ayant pas eu de fièvre depuis plusieurs jours, je revins à notre habitation de la campagne.

Le 13 et les jours suivans la fièvre étoit revenue et je fus obligé de retourner à la ville. J'y restay jusqu'à la fin du mois. Dans le courant du mois, je fis plusieurs voyages à l'habitation, particulièrement pour la récolte des graines de *Chinquapin*, *Styrax* &- &-

* *F. alnifolia*, L.—C. B. S.

Le 7 Octobre, 1788, je retournay à l'habitation.

Le 8 dud. Pluye toute la journée

Le 9 dud. Pluyes continuelles.

Le 10, nous avons été à la récolte du *Stewartia* et remarqué un *Populus heterophy.* dans la Plantation du nommé Willimon.

Le 11 préparé un envoy de graines pour le service du Département par la voye de New-York.

Le Dimanche 12 continué à travailler à l'envoy et à écrire les lettres.

Le 13 Octobre j'ay été à la ville po. delivrer les caisses au Navire, j'ay écrit à Mr le C^{te}, à M. l'Abbé, à Mr De la Forest, au S Saulnier, j'ay reçu une caisse d'arbres de Philadelphie, acheté des Planches.

Le 14 dud. je fus obligé de rester a la ville.

Le 15 je revins à l'habitation après avoir terminé mes affaires à la ville.

Le 16 planté les arbres reçus et semé des Chinquapins.

Le 17 voyagé à Dorchester po. la récolte du *Gleditsia aquatica.*

Le 18 semé graines de *Magnolia glauca.* et *Magn. tripetala.* *Chionanthus,* *Stewartia,* *Alaterne de Carol.* *Zanthoxil,* *Styrax,* *Halesia,* *Fothergilla,* *Magnol. acuminata,* *Viburnum dentatum.*

Le Dimanche 19, elagué les arbres du jardin et préparé le chassis du petit jardin, remis les vitrages.

Le 20 October, 1788, j'ay fait faire un abri pour garantir les *Illicium floridan.* des Vent du Nord et des Pluyes du N. Ouest.

Le 21 dud. j'ay envoyé une caisse au capit. Marshall po. qu'il me rapporte des arbres de S^t Augustin en Floride. Vent du nord et thermom. le matin à 10^a.

Le 22 thermometre le matin à 9 deg. semé dans une cloture particulière, *Chinquapins,* *Persimons,* *Fothergilla,* *Magn. glauca,* *Styrax,* *Juniperus,* & & . . .

Le 23 therm. le matin à six deg. 1-2 au dessus de O. Récolté *Pinus palustris* et *Fraxinus palustris.**

Le 24 October, 1788, recueilli comme le jour précéd^t Graines de Pins, & il s'est trouvé plusieurs arbres dont la graine étoit déjà tombée, quoique l'année soit plus abondante qu' à l'ordinaire, un arbre de un Pied et demi à 2 pi. de diametre ne produis^t qu' environ un Peck ou tout au plus un demi Boiss. de Cones.

Le 25 recueilli Gr. de Pins et mis en ordres les graines recueillies précéd^{em}t.

Le Dimanche 26 recueilli graines de Pin et mis en ordre mes Collections précédentes de graines.

Le 27 Octobre, 1788, mon fils a accompagné les nègres à la récolte des graines de Pins et j'ay travaillé avec le jardinier à faire un fossé po. détourner les eaux des *Illici.*

Le 28 j'ay été à Charleston et j'ay été obligé de rester jusqu' au lendemain pour avoir de l'argent dur pour du papier Monoye.

* *F. platycarpa,* Michx.—C. S. S.

Le 29 je suis revenu à l'habitation.

Le 30 récolté *Baccharis* et plusi. autres sortes de graines. Le 31 semé des graines.

Le 1^{er} Novembre 1788 récolté des graines de *Bignonia sempervirens* et couvert de feuilles les arbrisseaux de la Floride.

Le Dimanche 2 Novembre, récolté graines de *Nyssa dentata*, et préparé au voyage au de la d'Augusta.

Le 3 dud. récolté graines d'*Andromeda nitida*, *And. racemosa*, *Clethra*.

4TH CAHIER. 1788 & 1789.

Le 1^{er} Novembre 1788, récolté les graines de *Bignon. sempervirens* et couvert les arbriss. de la Floride pour les garantir des gelées de l'hyver.

Le Dimanche 2 dud. recueilli les graines de *Nyssa* à gros fruits & préparé à mon voyage pour la Georgie, reçu un billet de M. Petry pour me recommander de ne point aller en Georgie au sud de Savannah, à cause des Indiens qui ont recommencé les ravages.

Le 3 Novembre, 1788, j'ay envoyé à la récolte du *Bignon. crucigera*,* de l'*Andromeda nitida*, du *Clethra* et arracher du *Spigelia Marylandica* qui avoit été demandé particulierem^t dans les dernières lettres de M. l'Abbé Nolin.

Le 4 envoyé à Charleston relativement à l'arrivée de plusi. navires arrivés de New-York.

Le 5 parti de l'habitation pour Augusta et je vins coucher à Givham's ferry en passant par Dorchester.

Ce jour je fis 36 milles en évaluant cette marche comme si j'étois parti de Charleston même cy 36 M.

Le 6 Novembre 1788, diner à Stanley house, 26 M. et coucher à People house près le ferry Dantign. trente cinq Miles cy . . . 35.

Le 7 Déjeuner à Bruton-house 6 M. faisant la moitié du chemin évaluée entre Charleston & Augusta. Je vins coucher à *Chester house* cy . . . 30.

Le 8 diner à *Robertson house* ou White Pound, 15 M. Ici la Route de Long-cane se réunit à celle d'Augusta. De Roberts. a . . . house 10 M. cy . . . 25.

Le Dimanche 9. traversé des Pines barrens et dejeuné à 12 M. de Distance et enfin arrivé à Augusta après une marche de 10 M. cy. 22 M. Total de la distance 148 M.

Le 10 Novembre 1788, visité plusieurs personnes a qui j'avois été adressé, pluye toute la journée.

Le 11 j'ay été à l'habitation du Colonel Stallion et reconnu sur les bords de la riv. *Kalmia latifolia*, *Rhododendron* . . . , *Padus sempervirens*, † *Halesia* . . . , *Annona* . . . , *Acer* . . .

* *B. capreolata*, L.—C. S. S.

† *Prunus caroliniana*, Alt.—C. S. S.

Le 12 revenu à Augusta.

Le 13 j'ay été à la recolte du *Pavia** *spicata flore parvo, albo, nova species*: et trouvé sur les bors un arbre nouveau a f. oppos. observé l'année dern. en Georgie sur les bords des rivières.

Le 14 j'ay été à huit Miles d'Augusta pour recueillir un arbrisseau † qui a le Port de Erica, et rapporté aussi environ deux cent de *Epigea repens*.

Le 15 Novembre 1788, parti D'Augusta pour aller sur la route de Savanah de l'année dernière, j'observai plusi. Plantes rares particulièrement le *Lapathum occidentale*. Diné chez la V^e *Brown*, maison située entre deux Etangs 27 Miles et couché chez le Sr *Lambert* 37 Miles; trouvé le *Calycanthus* près de son habitation.

Le Dimanche 16 passé l'habitation du nommé *Bel* *taverne* à 42 Miles. Ensuite trouvé dans une Pine-barren de 12 Miles de traverse le *Ceanothus floridanus*‡ et un arbuste à grosses racines tracantes de la fam. des *Euph.* et af. de chêne. Trouvé ces deux arbustes particulièrement près de l'habitation de *Freeman* 54 M.

Continué ma route jusqu' à Beaver-Dam 60 miles d'Augusta et revenu coucher près de l'habitation de Sr *Bel*.

Nota (La roue de la voiture l'année dernière fut brisée dans une colline à 25 milles d'Augusta)

Le 17 Novembre 1788, revenu coucher à Augusta et recueilli toutes les Plantes les plus remarquables. Mon voyage pendant ces trois jours a été de 120 Milles.

Le 18 Encaissé les Plantes recueillies depuis mes courses aux environs d'Augusta.

Le 19 j'ay été recueillir des jeunes Plantes d'un *Rhododendron nova species* et d'un *Kalmia* qui a beaucoup de rapport au *Kalmia latifolia*.

Le 20 j'ay été recueillir des Plants de l'*Andromeda arborea* et de l'*Annona triloba*. Ensuite l'après midy j'ay encaissé ces Plants, j'ay remis les Caisses contenant onze cent soixante huit arbres ou Plantes au Sr *Inca* pour les envoyer par Savanah à Charleston.

Le 21 Novembre 1788 je suis parti d'Augusta et j'ay passé par *Beresfort-town* composée de 4 à 5 maisons située à 3 M. d'Augusta. Cinq miles plus loin en continuant la Route de Wilks-County on trouve plusieurs maisons près d'un Creek et au de la du Creek l'on pourroit recueillir plusi. milliers de Plants du *Calycanthus*.

La Maison du Sr *Grays* est à 15 Miles d'Augusta et on peut y loger. J'ay couché chez la V^e *Marchall* dont l'habitation est située à 20 miles d'Augusta.

Le 22 j'ay été si tourmenté par un mal de Reins que j'ay fait seulement douze miles. J'ay traversé *Little river* et à 4 miles au de la je suis venu coucher chez le *Colonel Grâce virginien*.

* *Æsculus parviflora*, Walt. (*Æ. macrostachya*, Michx.)—C. S. S.

† Probably *Ceratiola ericoides*, Michx.—C. S. S.

‡ *C. microphyllus*, Michx.—C. S. S.

Le Dimanche 23 je suis arrivé à Washington-town situé à 46 ou 48 Miles d'Augusta. Nota (Washington est la capitale de Wilks-county)

Le 24 Novembre 1788 j'allay voir un Medecin françois établi dans le Pays, il me donna des remedes et il m'ordonna le repos. Je reconnue près de Washington, le *Magnolia acuminata* que je n'avois pas vu dans ce voyage depuis mon départ de Charleston.

Le 25 et 26 la fievre jointe à une autre incommodité m'empêcha de continuer le voyage que j'avois résolu sur les Rivières Broad river & Tugelo river.

Le 29 je fus un peu rétabli et je partis de Washington. Je visitay à Washington un franç. M^r Terundet très considéré. Mon logem^t fut chez le *Colonel Stablerfield*. Je vins coucher chez le Colonel Gains dont l'habitati. est située sur Broad river a 20 M. de Washington.

Le Dimanche 30 Novembre 1788 je ne pus voir M^r Meriwether qui demeure près de Colon. Gaines et je traversay Broad river. Dans cet endroit la riv. avoit des roches qui rendoient le passage difficile pour les chevaux, sur tout après les pluyes. Il y a un ferry nomme . . . sur Savannah riv. éloigné de cet endroit de cinq milles. *Meriwether* passe pour un Botaniste il s'attache à connoitre toutes les Plantes de la contrée et je regrettay de n'avoir pu le voir. Je dirigeai mon voyage vers Tugulo riv. et je vins coucher chez. le Capit. *Richardson* à 15 miles de distance du Passage sur Broad river. J'avois diné en passant chez *l'Esquire Tets*.

Le 1^{er} Décembre je traversai plusieurs Creeks, le 1^{er} Beaver-dam situé à un mille et demi du Capit. Richardson. Un autre Creek Cool Water Creek situé à cinq milles du 1^{er} près l'habitation du Colon. Cuningham. Je passai Cider Creek à 8 mi. de distance du 3^e et je vins coucher sur Log-Light wood Creek à l'habitation du S^r *Freeman*. Je fus reçu av. beaucoup de civilités par la maitresse de la maison dont le mari étoit absent. Cette femme étoit jeune, très belle, mais très dévote et occupée continuell^{nt} des différentes manières de penser entre les Methodistes, les Anabaptistes et les Quakers. La conversation sur ces matières dura depuis 7 h. jusqu' a 10 $\frac{1}{2}$; je commencai alors à en être ennuyé malgré l'honnêteté et les agèments de cette femme et j'allay me coucher. Le Creek sur lequel cette habitation est située se rend en cet endroit dans la riv. Savannah à 15 Toises au dessous de la maison. Cette journée mon voyage fut de 20 M.

Le 2 Décembre 1788 je laissay le confluent de deux riv. Tugulo et Kiwi pour remonter le cours de Tugulo et je vins coucher chez le S^r Larkin Cleveland Esq^r 19 M.

Le 3 dud. je traversay la riv. Tugulo par l'endroit seul usité pour le passage. Il étoit si dangereux que deux de nos chevaux furent en danger d'être noyés. Je vins déjeuner chez *John Cleveland* de l'autre côté de la rivière. L'on me dit qu'il n'y avoit plus d'habitations et je traversay un pays couvert de bois de même que toutes les provinces du Sud, mais il étoit de plus très montagneux et j'arrivay le soir au coucher du sol. à Seneca après une marche de 19 Mles.

Le 4 Decembre 1788, il géla assez fort. On trouva de la glace d'une

ligne d'épaisseur et plus. A la pointe de jour j'allay visiter les bords de la rivière et je reconnus le *Zanthoriza*, *Rhododendron** *nova species*, *Kalmia latifolia*, *Hydrangea* (glauca), *Abies spruce*, *Acer negundo*, *Carpinus fructu* . . . *Annona triloba*, *Halesia tetraptera*, *Cornus alternifolia*, *Calycanthus* . . .

Le 5 je continuai mes recherches, tandis que mon Nègre étoit occupé à arracher les arbres que je lui avoit montré. Je cherchai un Interprete et un Indien cheroquois pour aller dans les montagnes habitées par cette nation.

Le 6 Décembre 1788 je partis pour les montagnes et je vins coucher avec mon guide dans un village Indien. Le chef du village nous recut avec affabilité. Il nous dit q. son fils qui devoit revenir de la chasse le même soir nous conduiroit dans les montagnes aux sources du Kiwi. Mais il ne revient pas et ce vieillard qui paroissoit avoir environ 70 ans s'offrit à m'accompagner. Cet homme qui étoit né dans un village vers les sources de cette Riv. connoissoit parfaitement les montagnes et je souhaitai q. son fils ne revint pas. Il nous fit servir à souper de la viande fraiche de Cerf bouillie et du pain de farine de Mays dans lequel on avoit mêlé des Potates douces (*Convolvulus batatas*). Je mangeai avec mon guide qui sachant parler Sauvage me servit d'Interprete. Le Chef mangea avec sa femme sur un autre banc, ensuite la mère de sa femme et ses deux filles, l'une mariée et la plus jeune d'environ 14 à 15 ans vinrent s'asseoir autour de la chaudière ou elles avoient fait bouillir la viande. Ces Dames étoient nues jusqu' à la ceinture, n'ayant d'autre habillemens qu'une seule jupe chacune.

Le Dimanche 7 Decembre, la maitresse de la maison fit rotir du mays avec de la Cendre passée au tamis dans un Pot de terre. Quand il fut roté un peu plus qu'à demi, on le retira du feu ou passa le cendre qui étoit mêlée. On le porta ensuite au mortier et étant pilé on le passa dans un tamis fin pour séparer la farine fine que l'on mit dans un sac po. notre provision. Lorsque l'on est fatigué on met environ trois cuillerées dans un verre d'eau, on y ajoute souvent du sucre brun ou Cassonade. Cette boisson d'ailleurs très agréable est un Restorant qui répare les forces dans l'instant. Les sauvages ne se mettent jamais en voyage sans une provision de cette farine qu'ils appellent . . .

Notre marche fut d'environ quatorze milles quoiq. depuis 7 h. et demie qu matin jusqu'à 6 h. du soir. Nous ne nous fussions arrêté qu'une heure po. dîner. Nous campames sur les bords du Kiwi au pied des montagnes, parmi les *Rhododend.* de 2 espèces. les *Kalmia* les *Azalea*, & -&-.

Le 8 Decembre 1788, à mesure que nous approchions de la source du Kiwi, les chemins devinrent plus difficiles. Notre marche fut de . . . , et deux miles avant d'y arriver je reconnus le *Magnolia montana* † qui a

* *R. punctatum*, Andr. (*R. minus*, Michx.)—C. S. S.

† *M. Fraseri*, Walt. The specimen labelled *Magnolia cordata* by Richard in Michaux's herbarium, is clearly a form of *M. acuminata*, with broad leaves, cordate at the base. It seems to confirm my opinion expressed before I had an opportunity of examining this

été nommé *M. cordata* ou *auriculata* par Bartram. Il y avait en ce lieu une petite cabane habitée par une famille de sauvage Cherokees. Nous nous ariétames pour y camper et je courrus faire des recherches. Je recueillis un nouvel arbuste* à f. dentelées rampant sur la montagne à peu de distance de la riv. Le temps changea et nous eumes de la pluie toute la nuit, quoique nous fussions à l'abri d'un gros *Pinus Strobus*, nos habits, nos couvertures furent trempés et traversés. J'allai vers le milieu de la nuit dans la Cabane des sauvages qui pouvoit à peine contenir la famille composée de huit personnes, hommes et femmes. Il y avoit de plus six gros chiens qui augmentoient la malpropreté de cet appartement et l'incommodité. Le feu étoit placé au milieu sans ouverture au haut de la cabane pour laisser sortir la fumée, il y en avoit cependant assez pour recevoir la pluie au travers la couverture de cette maison. Un Sauvage m'offrit son Lit qui étoit une Peau d'Ours et vint prendre ma place auprès du feu. Mais enfin incommodé par les Chiens qui se mordoient continuellement pour avoir leur place au feu, je retournay au camp, la pluie ayant cessé.

Ce lieu que l'on nomme la source de Kiwi est ainsi improprement nommé, C'est la jonction de deux autres rivi.† ou gros Torrents qui viennent se réunir en ce lieu et n'ont pas été nommés sinon Branches de Kiwi.

Le 9 dud, nous partimes guidé par mon sauvage pour visiter les plus hautes montagnes et aller à la source de ce torrent qui me parut le plus escarpé. Il fallut passer des précipices et des torrens couverts d'arbres ou dix fois nos chevaux s'enfoncerent et furent en danger de périr. Nous remontames jusqu'à une cascade ‡ ou le bruit de l'eau en tombant ressembloit à des coups éloignés de Mousquets. Les sauvages disent que l'on voit paroître en ce lieu des feux la nuit. Je desiray y camper, mais la neige qui survint et le vent étoit si froid que nous cherchames le bas d'une montagne moins exposée au froid et un lieu plus garni d'herbes pour nos chevaux. La nuit fut horriblement froide, il n'y avoit pas en ce lieu de bois de Pin. pour entretenir le feu qui bruloit mal à cause de la neige qui tomba à plusi. reprises. Nos couvertures couvertes de neige devenoient roides de gelée peu après avoir été chauffées.

Le 10 Decembre. Je visitay plusi. montagnes, sur la pente et dans les lieux bas nous arrachâmes le *Magnolia cordata*, la journée fut employée plus particulierement à la recherche de cet arbre.

specimen, that *M. cordata*, as now known in gardens, must be considered a variety of *M. acuminata*, from which it may be distinguished by its smaller flowers, with bright yellow petals, and by its more uniformly cordate leaves, often quite tomentose on the lower surface. The *M. cordata* of this Journal is probably always *M. Fraseri*. For further remarks upon this subject see an article on Michaux's Journey to the Carolina Mountains, in December, 1788, in the *American Journal of Science*, Vol. XXXII, December, 1886.—C. S. 8.

* The indications that this entry refers to the plant afterwards described by Dr. Asa Gray, under the name of *Shortia galacifolia*, are pointed out in the *American Journal of Science*, in the article referred to above.—C. S. 8.

† Now known as the Horsepasture and the Toxaway Rivers.—C. S. 8.

‡ The beautiful Falls of the Toxaway.—C. S. 8.

Le onze dud. il gela considérablement et l'air fut clair et très vif. Je remarquai une suite de hautes montagnes* qui se prolongeoient de l'Ouest à l'Est et ou la gelée s'étoit fait peu sentir à l'exposition du soleil. Je recueillis un *Juniperus* (repens) que je n'avois pas encore remarqué dans les parties méridionales des Etats-Unis; mais il faut observer que je vis sur ces montagnes plusieurs arbres des parties septentrionales telsque le *Betula nigra*, *Cornus alternifolia*, *Pinus Strobus*, *Abies Spruce* &c. Nous traversames un espace d'environ trois miles dans les *Rhododendrons maximum*. † Je revins camper avec mes guides à la Tête du Kiwi (head of Kiwoe) et je recueillis une grande quantité de cet arbuste à f. dentelées trouvé le jour que j'arrivay. Je ne le rencontray sur aucune des autres montagnes. Les sauvages du lieu me dirent que les feuilles avoient bon gout étant machées et que l'odeur en étoit agréable en les froissant, ce que je trouvois effectivement.

Direction pour trouver cet arbuste.

La Tête du Kiwi est la jonction de deux Torrens considérables qui coulent par cascades des hautes montagnes. Cette jonction se fait dans une petite plaine ou il y avoit autrefois une ville ou plutôt un village de Cherokees. En descendant de la jonction de ces deux torrents ayant la rivi. à gauche et les montagnes qui regardent le Nord à droite, on trouve à environ 30 à 50 toises de ce confluent un senti. ‡ formé par les chasseurs sauvages, il conduit à un ruisseau ou l'on reconnoit les vestiges d'un village de Sauvages par les Pêcheurs qui subsistent au milieu des Brouss. En continuant ce sentier on arrive aussitôt sur les montagnes et l'on trouve cet arbuste qui couvre le sol avec l'*Epigea repens*.

Le 12 Décembre 1788. Je visitay les montagnes exposées au Sud en revenant, car les provisions étoient si avancés, qu'il y eut un Dejeuner très sobre. Je recueillis beaucoup de *Magn. cordata* en un meilleur état que ceux des jours précédents.

Nous cotoyames la riv. et nous vimes plusi. troupes de Dindon sauvages. Notre guide sauvage tira dessus mais le fusil qui n'avoit pu être garanti de la pluie q. ques jours auparavant manqua à plusieurs reprises. Ainsi notre souper fut de q. ques chataignes q. notre sauvage avoit reçu d'un autre de sa nation.

Notre marche fut de dix-huit miles. Le temps fut très clair, la gelée se fit sentir dès le soir même et après avoir demandé à mon sauvage les noms de plusi. Plantes dans son Langage, j'écrivis mon journal au clair de la Lune.

Le 13 Décembre, j'essayai à la pointe du jour de tuer un Dindon sauvage do. il y avoit abondance en cet endroit, je ne pus y réussir et nous décampames sans Déjeuner. Nous dirigeames affamés notre route vers un Camp de Chasseurs sauvages et quoique les Montagnes fussent moins

* The Balsam Range of Mountains.—C. S. S.

† This *Rhododendron* thicket, the most extensive and impenetrable in all this part of the country, still exists.—C. S. S.

‡ This path still exists very much in the same condition, probably, as Michaux found it a hundred years ago.—C. S. S.

escarpées il étoit une heure après midy quand nous y arrivâmes après une marche de six heures qui ne fut évaluée que quinze miles de chemin. On nous fit cuire de la Viande d'Ours coupée en petits morceaux et frite dans la graisse même d'Ours. quoiqu. (il) fut très abondante en graisse nous fîmes un très bon diner et quoique je mangeai beauco. de la partie la plus grasse de cette viande je ne fus pas incommodé. La graisse d'Ours n'a pas de gout et ressemble à la bonne huile d'Olive, elle n'a pas même d'odeur quand l'on a fait rotir q. ques mets avec elle ne se fige que lorsqu' il gèle. L'après diner notre Marche fut de seize Miles et nous arrivâmes le Soir à Seneca.

Le Dimanche 14 Décembre 1788 on me donna avis qu'il devoit partir le lendemain un chariot pour Charleston. J'envoyai chercher deux Dindons sauvages que j'avois acheté à trois miles de distance de cet endroit, et je recueillis plusi. espèces d'arbres Rhododendrons . . . , Nyssa, Montana . . . , Mespilus des Montagnes &c &c, . . .

Le 15 je payai mon sauvage qui m'avoit accompagné dans sa nation, je travaillai à l'encaissage des arbres, j'en arrachai de nouveaux et je fis recueillir des graines. Recueilli le Pavia (lutea) (?), le Quercus glauca, &-& . . .

Le 16 j'ay travaillé pendant toute la journée à encaisser des arb. et j'en ay arraché plusieurs espèces que j'avois reconnu aux environs.

Le 17 j'ay terminé l'Emballage des arbres, réglé le compte des Dépenses pendant mon Séjour et préparé toutes choses po. mon Départ.

Le 18 je suis parti de Seneca, un des Dindons sauvages que j'avois acheté, mourut à environ deux miles de distance du lieu où nous étions parti et le deuxième mourut en arrivant au lieu de campement. Notre marche fut de quinze miles à cause que l'on fut obligé plusieurs fois de s'arrêter pour réparer les deux Cages qui étoient sur un cheval et qui par les efforts de ces oiseaux penchoient d'un coté ou d'un autre. Nous campâmes dans les bois faute d'habitation.

Le 19 nous mangeâmes le Dindon sauvage qui mourut en arrivant au lieu de campem^t ayant jeté celui qui mourut le premier et n'ayant pas diné ni soupé la veille. Je vins coucher à Rocky riv. 26 miles de Seneca et je ne fis que 12 M. à cause du mauvais temps.

Le 20 Décembre le froid fut excessif et je vins coucher à la Plantation du Général *Pickens* située à 45 M. de Seneca. Je fis seulement 20 Miles cette journa. ayant visité les environs de Little river pour chercher le *Magnolia acuminata*. J'y reconnus le *Magn. tripetala*, l'*Annona* et le *Magnolia acuminata* aux env. de l'habitation *Pickens* dans un sol argilleux et d'un rouge brun.

Le Dimanche 21 Decembre 1788 le froid fut encore très considerable. Il fallut passer plus de vingt Creeks considerables et je vins coucher à Turkey Creek* chez un americain-Tauris† qui me dit en arrivant qu'il

* Un peu avant de passer le Creek est l'habitat. à main droite du Colon . . . où l'on doit plutôt loger.

† Tory.—C. 8. 8.

me tueroit si je passois la nuit chez lui, et je lui dis que je ne craignois pas cela, n'étant pas assez gras ni ma bourse non plus. Il voulut me badiner sur ma nation, mais j'avois assés à lui répondre et il se contenta de me faire payer cher le logement. Je fis cette journée vingt neuf miles.

Le 22 Decembre 1783 le froid continua et vers l'après midy il y eut de la pluye très froide. Je vins coucher chez le Capit. Baudet. Il se trouva là deux voleurs de chevaux. Les habitants des environs étoient assemblés pour leur faire leur procès. Ils renvoyèrent un d'eux et l'autre fut batonné. A cette occasion ils s'étoient tous enivrés de Rum et toute la nuit je fus importuné et fatigué de cette desagréable Compagnie. Mon voyage fut cette journée de 28 Miles.

Observé sur une Colline dont le sol est calcaire et argilleux l'Epigea repens en abondance. Il est rare de rencontrer un sol calcaire dans les parties basses de la Carol.

Le 23 je partis de cet endroit et vins déjeuner à deux Miles de distance à main droite chez un homme très honnête.* Ensuite il fallut passer un bois stérile (Pine barren) de 18 M. de long et j'arrivay à *Robertson house*. je fis encore 12 M. en tout 32 M. cette journée. Je vins coucher chez Walker.

Le 24 je passay par Chester house située à 4 miles de distance et je vins coucher à la maison du Sr. People. Cette journée je fis 34 Miles.

Le 25 je passay par Stanley house située à 9 miles de distance et je vins coucher à Guivcham's ferry.† Notre marche fut cette journée de 35 miles.

Le 26 Décembre 1783, je partis de Guivesham ferry et je vins coucher à l'habitation. La distance de ce ferry est 35 M. de Charleston.

Le 27 je plantay une collection des arbres qui avoient été apportés sur un cheval.

Le Dimanche 28 je visitay les graines qui avoient été recueillies pendant mon absence &c. Le 29 j'ay été à Charleston.

Le 30 j'ay appris la destination d'un navire pour Le havre de Grace et je suis revenu à l'habitation pour préparer un Envoi d'arbres et de graines principalement.

Le 31 Décembre 1783 j'ay encaissé plusi. espèces de graines et j'ay envoyé à Charleston pour apporter trois caisses d'arbres que j'avois recueillis dans mon dernier voyage et qui me sont arrivés par le voye de Savannah.

Le 1^{er} Janvier 1789 j'ay ouvert les caisses, j'ay trouvé les arbres en bon état, mais un peu de végétation ayant développé les bourgeons, ils avoient poussés et pour prévenir le froid et même un peu de gelée qu'il y avoit

* Nota : po. coucher un autre voyage dans cet endroit.

† Entre le ferry et la maison située dix miles plus loin en allant à Seneca on trouve plusi. (Ponds) étangs ou il y a abondant un Ilex] à feuilles étroites et tres petites. Les voyageurs peuvent s'arrêter la nuit dans cette Mais. (située à environ 45 de Charleston.)

] Probably *Ilex Dahoon*, var. *myrtifolia*, Chapman. (*I. myrtifolia*, Walt.)—C. S. S.

alors toutes les nuits, j'ay retiré les arbres de la mousse d'ou ils étoient envelop. au milieu de jour je les ay trempé immédiatement dans un Baquet d'eau que je tenois auprès de moi et après les avoir bien immerse je les ay tenu sous de la mousse mouillée jusqu' au moment de les planter : j'ay aussi couvert de mousse ceux qui avoient les bourgeons développés.

Le 2 Janvier 1789 j'ay envoyé pour s'informer si les arbres j'attendois étoient arrivés.

J'ay continué de planter les arbres recus de Georgie que je réserve pour le jardin afin de les envoyer successivement.

Le 3 j'ay envoyé les Caisses préparées au nombre de cinq à Charleston, j'y ay été moi-même aussi et je suis revenu le même jour.

Le Dimanche 4 continué l'encaissage des graines.

Le 5 Janvier 1789 Encaissé des graines pour le jardin de New-York afin de profiter d'un Batim^t destiné pour ce Port. Ecrit à M. De la Forest et au S^r Saulnier.

Le 6 continué le même ouvrage concernant les graines.

Le 7 Idem.

Le 8 Envoyé à Charleston pour sçavoir le jour du Départ du Navire et j'ay appris que l'Armateur ne vouloit pas charger a fret quoique ce fut sur son navire.

Le 9 j'ay été à Charleston et j'ay obtenu avec M. Petry que j'enverrois dix à douze caisses.

Le 10 Janvier j'ay complété l'Envoy des Arbres et des Graines.

Le Dimanche onze j'ay écrit mes Lettres à M. le C^{te} Dangivill à M. l'Abbé, M. Le Monnier, M. Thouin &c.

Le 12 Envoyé Treize caisses à Charleston et j'y ai été ce même jour. J'y suis resté jusqu' au 15 dudit tant pour faire garnir de cercles ces caisses que pour les faire embarquer.

Le 15 je suis revenu à l'habitation.

Le 16 j'ay fait et préparé un Envoy de graines pour le jardin du Roy à New-York.

Le 17 j'ay continué le même travail.

Le Dimanche 18 Janvier 1789 j'ay préparé un Envoy d'oiseaux pour M. Dantie à l'adresse de M. le Baron D'Ogny : j'ay mis en ordre la collection des différents Vaccin. et j'ay envoyé à M^r L'Héritier. J'ay écrit les Duplicata de lett. à M^r le C^{te} D'Angiv. &c &c.

Le 19 j'ay été à Charleston et j'ay fait embarquer l'Envoy d'oiseaux et les Vaccin. sur un navire pour Nantes.

Le 20 j'ay complété l'Envoy pour M^r l'Abbé Nolin qui avoit été différé par le capit. du navire.

Le 21 Pluyes orageuses et travaillé au même Envoy. Ecrit à M^r Beaudin à M. Plane et à M. Bartram à Philadelphie.

Le 22 j'ay été à Charleston pour faire embarquer cet Envoy.

Le 23 Janvier Envoyé pour apporter deux Cerfs nains à l'habitation et travaillé à faire un Envoy pour le Havre de Grace, ayant été informé le jour précédent d'un navire destiné pour ce Port.

Le 24 reçu ma collection d'arbres des Montagnes faisant six caisses et un Paquet d'arbres.

Le 25 Dimanche continué à travailler à l'Envoy pour le havre et planté une partie des Arbres recus.

Le 26 j'ay été à Charleston faire embarquer plusieurs Caisses et j'ay écrit plusieurs Lettres.

Le 27 Janvier 1789 je suis revenu à l'habitation.

Le 28 j'ay planté les arbres arrivés des Montagnes et j'ay écrit plusieurs Lettres pour la France et une Lettre de Change sur M. Desaint à l'ordre de M. Petry.

Le 29 j'ay été à Charleston, j'ay remis mes Lettres au Capit, du navire, &c. &c. Je suis revenu le même jour à l'habitation.

Le 30 j'ay semé des graines.

Le 31 Jauvier recueilli des fleurs de l'Alnus, N° 1^{er} *Alnus* ♂ *Amentum imbricatum squamis 3-floris* . . . *Cor. minima 4-partita* ♀ *Ament. imbricatum Pistillum styli duo, nonnunquam 3.*

Le Dimanche 1^{er} fevrier 1789 j'ay encaissé des Arbres et des Graines pour l'Etablissement de New-York.

Le 2 et 3 fevrier meme travail.

Le 4 j'ay été à Charleston et j'ay parlé au Capit. du navire pour aller aux Isles Bahama.

Le 5 je suis revenu à l'habitation.

Le 6 j'ay fait labourer dans le jardin.

Le 7 continué le même travail.

Le Dimanche 8 fevrier, 1789, semé des Graines d'arbres et d'arbrisseaux.

Le 9 j'ay été à Ch.

Le 10 je suis revenu à l'habitation pour me préparer au Voyage des Isles Bahama.

Les 11, 12, 13 j'ay semé des graines et réglé toutes choses po. mon Départ.

Le 14 j'ay été à Charleston.

Le Dimanche 15 je restay à Charleston en attendant le vent favorable.

Le 16 fevrier 1789 je m'embarquay sur le Schooner The Hope Capit. Weeks pour les Isles Bahama.

Je restay dix jours en mer et je débarquay le 25 dud. à New Providence.

Je fis quelques visites ce même jour.

Le 26 je visitay Mylord Dunmore, Gouverneur des Isles Bahama.

Il me fit un accueil favorable et me pria de lui donner q. q. graines et des Echantillons de Plantes po. envoyer à M. Banks sc: *Cedre, Ebene &c. Elathera cortex.*

Le 27 j'allay herboriser et je reconnus les Plantes suivantes: *Vinca lutea, Annona glabra, Laurus persea, Laurus indica fol. perennantib. vel Cornus fol. salicis laureae acuminatis florib. albis, frutex Sassafras. Catesb. Calceolaria? foliis integris, Psydium, Tamarindus indica, Catesbaea spinosa, Bursera gummifera, Coccoloba &c. &c. &c.*

Le 28 je continuai mes herborizations.

Le Dimanche 1^{er} Mars 1789 herborisations continuées.

Le 2 Mars herborisations continuées: reconnu un *Gardenia*,* vulgairement *The seven years apple*. . . .

Le 3. 4 et 5 j'ay continué mes herborisations.

Le 6. 7 et 8 j'ay arraché des arbres pour envoyer au jardin de Charleston.

Le Dimanche 8 Mars 1789 j'ay complété ma collection de huit cens soixante arbres parmi lesquels se trouvent *Amyris etemifera* *Winterania Canella*, *Croton cascarilla*, *Gardenia nova species*, *Chrysocoma nova species*, *Annona glabra*, *Annona muricata*, *Annona* . . . *Catesbæa spinosa*, *Bignonia pentaphylla*, *Passiflora cuprea*, *Anacardium?* . . . &c. &c. &c. &c. &c.

Le 9 dud. j'ay écrit à Mons. le C^{te} Dangiviller, à M. l'Abbé Nolin, à M. Petry, M. Robinet et à mon fils.

Le onze Mars 1789 j'ay herborisé et j'ay continué mes herborisations sur l'Isle de *New-Providence* jusqu' au 14 dudit.

Le Dimanche 15 dudit. j'ai révisé mon herbier et mes récoltes de graines.

Le 16. 17. 18 et 19. j'ay été herboriser sur des petites isles voisines de *New-Providence*, nommées *Keys*.

Le 20 j'ay fait marché avec un *Pilote-Cotier* pour me conduire sur les *Isles Lucayes*.

Le 21 j'ay eu un accès de fièvre po. avoir dormi au frais sur le bord de la mer.

Le Dimanche 22 Mars 1789. Le nombre des Graines de différentes sortes recueillies depuis mon arrivée ici s'est monté à soixante quinze espèces.

Le Dimanche 29 Mars 1789 je me suis préparé à partir pour *Charleston*. Mais le navire a mis à la voile le :

Le jeudy 2 Avril et le vent favorable nous avons perdu de vue ce même jour l'Isle de *New-Providence*.

Le 3 Avril calme &-

Le 4 nous avons reconnu une petite Isle nommée

Le 5 reconnu l'Isle de *Bahama* qui a plus de 15 lieues de longueur.

Le 6 avril calme.

Le 7 calme.

Le 8 calme et toujours en vue de *Bahama*.

Le 9 Orages, Trombes marines et Vent contraire.

Le 10 et jours suivans mauvais temps.

Arrivé et débarqué le 20 dudit à *Charleston* toutes les provisions épuisées et très fatigué par le mauvais temps.

Le 21 Avril resté à *Charleston*.

Le 22 j'ay été à l'habitation.

* *Genipa clusiofolia*, Griseb.—C. 8. 8.

Le 23 Mes Arbres et Graines recueillies aux Isles Bahama sont arrivées à l'habitation au nombre de plus de neuf cens Arbres.

Le 24 j'ay fait préparé un terrain et j'ay planté les Arbres.

Les 25, 26, 27 et 28 j'ay continué le même travail.

Le 28 Avril j'ay fait un Envoy de Graines à M. le Comte d'Angiviller; à Monsieur frère du Roy et au jardin du Roy.

Le 29 et 30 Avril continué de travailler à l'Envoy et à écrire mes lettres.

Le 1^{er} May 1789. semé les Graines rapportées de Bahama.

Le 2 dud. travaillé au jardin et continué de semer de planter &c. &c.

Le 3, 4 et 5 même travail &c. &c.

Je me suis préparé au voyage dans les Montagnes.

Le 6 May j'ay été à Charleston.

Le 7 May 1789 j'ay fait plusieurs démarches avec M. Petry consul de France po. avoir de l'argent pour mon voyage et je suis revenu à l'habitation sans avoir terminé.

Le 8 continué plusieurs ouvrages essentiels au jardin concernant les Plantes rapportées de Bahama.

Le 9 j'ay fait faire un abri pour garantir les arbres des grandes pluyes.

Le Dimanche 10 May j'ay décrit un Spirea dioque Germe à trois styles, rapporté des Montagnes: j'ay rédigé et pris en ordre plusieurs papiers.

CAHIER 5.

SUITE DE 1789.-1790.

Journal depuis mon départ de Charleston.*

Le 30 May 1789 Party de Charleston.

Le 6 Juin arrivé à Cambden, petite ville située à 12 miles de Charleston.

Le 10 dudit passé par Charlotte en Mecklembourb. county situé à 80 M. de Cambden.

Vu un *Magnolia cordata* à 18 Miles de Charlotte. Ce *Magnolia* paroît differer même du *M. cordata* découvert quelques années auparavant, les feuilles étoient d'un glauque ou couleur bleuâtre très marqué par dessous.

Un peu avant d'arriver au ferry sur la rivière Catawba vu un arbrisseau inconnu n'ayant ni fleurs ni fructification, il ressemb. à q. ques égards au *Calycanthus*.

Vu près de Burke Court house le même arbuste.

Le 13 Juin 1789 arrivé à Burke Court house, 80 M. de Charlotte. Visité le Colonel Avery et le 14 parti de Burke. Etant à 298 M. de Charleston

* Mon journal ayant été perdu le 1^{er} Juillet 1789, un grand nombre d'observations interessants depuis le 30 May jusqu' a cette datte seront abrégées.

vu le *Magnolia cordata* au pied de plusieurs Montagnes assez hautes, remarqué le sol argilleux et les Roches de Quartz.

Le 15 arrivé à l'habitation du Colonel Waford entre des montagnes élevées. Ce lieu est nommé Turkey-cove. La distance de Burke à Turkey-Cove est de 30 Miles, 310 M. de Charleston.

Le 16 logé chez le capitaine Ainsworth situé à un Mile et parent du Colon Waford.

Le 17 party pour Black mountain situé à . . . Miles de Turkey-Cove.

Nos herborisations sur cette montagne ont duré jusqu' au 22 dud. Reconnu un *Azalea nova species*, *Andromeda* . . . *Vaccinium* . . . *Viburnum* . . . et plusieurs autres Plantes que la perte de mon journal m'empêche de décrire mais mon herbier fait preuve que ces Plantes sont nouvelles.

Le 22 arrivé de nouveau chez le capit. Ainsworth.

Le 23 Juin 1789 parti pour Yellow Mountain.

Le 24 arrivé le soir au pied de Yellow Mountain situé à 30 M. de Turkey-cove. Cette montagne est regardée (considérée) dans la Caroline septentrionale et dans la Virginie comme la plus haute Montagne de toute l'Amérique septentrionale.

J'y reconnu . . .

Il y a 5 Miles de marche pour arriver au sommet de cette montagne. Avant d'y arriver l'on marche pendant plusieurs miles sur la chaîne des plus hautes montagnes nommée Blue ridges.

Le 28 Juin arrivé chez le capitaine Farkison, première habitation après avoir quitté Turkey-Cove. Le Chemin est étroit, escarpé en plusieurs endroits, l'on est obligé d'aller souvent à pied ; plusieurs fois nous avons été obligé de couper les branches d'arbres des *Kalmias* avec le Tomahack qu'il faut toujours porter quand on voyage dans ces forêts appelées Wilderness. La distance du sommet de Yellow Mountain jusque chez le capit. Farkinson est de 15 M.

Le 28 nous avons logé chez le Major Carter situé à 20 Miles du sommet de Yellow Mountain.

Le 29 Juin 1789 nous avons passé la rivière et nous avons couché à . . . 4 miles de Block house. Block house est un lieu renommé pour le rendez-vous des Voyageurs qui passent au Kentucky. La distance de l'habitation du Major Carter à Block house est de 25 M. ce qui fait 390 Miles de Charleston.

Nous avons appris que la semaine précédente plusieurs voyageurs furent tués en revenant du Kentucky par les sauvages et je pris le parti d'abandonner le voyage du Kentucky pour continuer mes herborisations sur les montagnes de la Virginie.

Le 30 Juin continué ma route vers les Montagnes et le même soir entré sur le territoire de la Virginie.

Le 1^{er} Juillet arrivé à Washington Court house première ville* de la Virginie que l'on trouve sur le coté occidental des Montagnes en sortant de la Caroline septentrionale. De Block house à Washington la distance est de 35 Miles.

Le 2 nous avons couché à 30 Miles de Washington 65 M.

Le 2 dud. à 35 Miles de Washington remarqué un Plante dont la fructificat. solitaire sur une hampe avoit la forme d'une pipe montée sur son tube. Les feuilles double sur un seul petiole. Observé la fructificat. du Ginseng: Cal. Umbella simplex; Involucrum foliolis subulatis, propriis unicuique flori partiali. Cal. proprius minimus 5-dentatus, Cor. Petala 5 oblonga recurva. Stam. 5, longitud. corollæ, Antheræ incumbentes, Germen subcompressum inferum. Styli duo, stigmata recurva.

Le 3 nous avons couché à Stone-Mill situé à 93 Miles de Block house.

Le 4 Juillet passé par Montgomery Court house nommé aussi Fort Chisses et couché deux Miles au de la. Notre marche fut de 13 Miles seulement, à cause de la pluie.

Le Dimanche 5 notre marche fut de 28 Miles et nous avons couché au ferry de New-River.

Le 6 à Midy et demi nous avons passé la Montagne qui termine celles nommées Appalaches et commence celles nommées Alleganias. Notre Marche fut de 36 M. Depuis que nous eumes passé le coté Oriental des Montagnes vers le quel les rivières coulent dans la mer (parceque à l'ouest de ces montagnes, les Rivières sont censées se perdre dans l'Ohio et le Mississippi) immédiatement remarqué le Diospiros, le Cephalanthus, l'Annona et plusieurs autres arbres que je ne vis pas auparavant.

Le 7 Juillet 1789 remarqué un Pavia lutea de 3 pieds de diametre et sur la Rivière Roanock le Thuya occidentalis parmi les Rochers escarpés qui bordent cette Rivière à l'exposition du Nord. Notre marche fut de 34 Miles.

Le 8 nous avions visité une arcade naturelle; † de 300 pieds de hauteur.

Le 9 parti de Lexington, petite ville dont le commerce est assez entretenu avec les établissemens sur les Rivières occidentales (Western Vaters settlements) ainsi nommées.

Le chemin quoique hors des hautes montagnes fut entrecoupé de Colines couvertes de Rochers et de ruisseaux. Les Rochers sont de substance calcaire noiratre très dure et entreveinées de Quartz, le sol généralement est argilleux mélangé de substance calcaire à un degré beaucoup moindre avec l'argille. Marche de 24 Miles.

Le 10 Juillet nous avons passé par Staunton petite ville très commerçante dans ces montagnes: Un Mile et demi avant d'y arriver remarqué

* Première ville si l'on peut nommer ville une Bourgade composée de 12 Maisons (Log-houses). Dans cette ville, on ne mange que du Pain de mays. Il n'y a ni viande fraîche ni cidre, mais seulement du mauvais rum.

† The Natural Bridge of Virginia.—C. S. S.

dans une Prairie le long des ruisseaux un *Spiraea** dont les fleurs en panicules de couleur rose de même q. les précédentes. Cal. 4-partit. lacin. parvis, reflexis, marcescentib. Pet. 4 subrotundo-angulata : unguiculata, unguibus lineari-pedicellatis. Stam. 32 inserta calyci, filamenta longissima. Antheræ subrotundæ, erectæ, Germina sex oblonga, Styli breves, recurvi. Stigmata capitata.

Notre marche fut de 15 Miles à cause de la Pluie.

Le onze nous avons passé la Rivière appelée North Branch et continué la route à travers un pays inégal, montagneux, ayant les Blue Ridges à notre droite et les Monts Alleganies à notre gauche ; Notre journée fut de 25 Miles.

Le Dimanche 12 Juillet remarqué dans une prairie sur le bord d'un ruisseau le même *Spiraea* trouvé le jo. précédent. Celui-ci étoit auprès de l'habitation dont la maison étoit la plus ornée que j'aye vu jusque la dans cette partie de la Virginie. Cet homme me montra tout ce qu'il avoit fait pour améliorer la culture de sa ferme et même pour l'embellir. Il avoit des Vaches d'une sorte venus depuis peu d'Angleterre, des Cochons très grands, très gros et différents de ceux du Canton. Il fumoit régulièrement ses terres. Les arbres à fruits étoient bien entretenir &c.

Notre marche fut de 30 Miles et nous avons passé par un petit Bourg nommé New Market.

Le 13 Juillet 1789 passé par Stowerstown autre Bourgade sit. à 40 Miles de Winchester. Rem. un peu avant d'arriver à cette bourgade sur la pente des Montagnes qui bordent la Rivière le *Thuya occidentalis*. Notre journée se borna à 27 Miles.

Le 14 passé par Winchester, petite ville dont le Commerce av. les Etablissements du Kentucky se fait par terre. Les marchandises viennent de Philadelphie, Alexandrie et particulièrement de Baltimore. Notre marche fut de 25 Miles.

Le 15 passé par Charleston, petite ville composée de 6 à 10 maisons située à 22 Miles de Winchester. Ensuite nous passames la Rivière Potomack pour entrer dans l'Etat de Maryland à 30 Miles de Winchester. Les Rivières de Shenandoah et de Potomack se joignent au lieu nommé Harper-ferry. De hautes montagnes escarpées et couvertes de Rochers se rapprochent en ce lieu. Observé plusi. Plantes Européennes un peu avant de sortir de la Virginie scav. *Hypericum perforatum*, *Arctium lappa*, *Echium vulgare*, *Trifolium lagopus*, *Verbascum album* et *Verbasc. nigrum*, *Veronica officinalis* &c. &c. . .

Le 16 Juillet 1789, nous avons passé par Fredericktown petite ville du Maryland bien bâtie, les maisons sont en brique et le Commerce y est assés florissant 25 Miles.

Le 17 rien de particulier ; le sol fut moins montagneux ; les Roches de Quartz souvent très pur mais q. quefois combiné avec des substances ferrugineuses. Je vis aussi plusieurs fois des Collines dont les Roches étoient de substance calcaire et le sol argilleux comme la plus grande partie de la

* *S. lobata*, Murr.

Virginie. Dans les endroits du Maryland ou la substance calcaire est combinée avec l'argille, les grains qui étoient alors sur pied m'ont paru meilleurs et la végétation sur les parties incultes plus forte, plus vive, les arbres plus verts, les herbes plus fortes et les bestiaux plus vigoureux.

Dans toute l'étendue de la Virginie du Nord au Sud, au de la des Monts Blue Ridges le sol m'a paru avoir généralement cette combinaison d'Argille avec une portion moindre de substance calcaire, le pays est riche, produisant beaucoup de grains, les bestiaux en abondance et gras en tout temps de l'année, les chevaux vigoureux et les habitans jouissans de la meilleure santé. Un cultivateur de ces Cantons m'a dit que le froment rendoit communément 15 Boisseaux par Acre mais très souvent 12 Boiss. rarement 20 Boiss. Notre journée fut de 31 *M.*

Le 18 Juillet passé par Little York, assez jolie ville sit. à 59 Miles de Frederick town. La campagne m'a paru mieux cultivée dans ces environs. Les habitans sont des Allemands aussi bien qu'en Pennsylvanie. Ils sont généralement très laborieux et très industrieux. Le sol dans cette partie du Maryland est alternativement argilleux, calcaire et q. quefois ferrugineux. Les Pierres et les Roches sont Quartz, schitz ferrugineux. En plusieurs endroits on trouve des Roches de substance calcaire primitive entremêlée (entrecoupée) de filons de Quartz.

Notre journée fut de 24 *Miles* seulement.

Le Dimanche 19 Juillet passé à Lancaster petite ville de Pennsylvanie peuplée d'Allemands. (Le matin nous avons passé la rivière Susquehanna.) Notre journée fut de 21 Miles.

Le 20 notre marche fut de . . . *Miles.*

Le 21 nous arrivâmes à Philadelphie après avoir fait depuis notre départ de Charleston un voyage de plus de . . . non compris les courses dans les Montagnes qui s'écartent de la route principale.

Le 22 visité M. De Marbois Consul de France.

Le 23 Juillet visité le jardin de M. Bartram, Botanist près de Philadelphie, remarqué dans son jardin un *Prinos nova sp.* dont les feuilles acuminées ne sont point dentelées. Vu *Zanthoxilum monoique* des parties septentrionales de l'Amérique. *Hydrastis* . . .

Le 24 et 25 occupé à des visites.

Le Dimanche 26 visité q. ques jardins aux environs de Philadelphie.

Le 27 envoyé mes chevaux à la campagne po. diminuer la dépense qui en est plus considerable dans une grande ville.

Le 28 continué de même que le jour précédent à faire Provision d'objets qui ne se trouvent pas à Charleston et qui étoient nécessaire po. mon jardin établi en Caroline.

Le 29 parti pour New-York.

Le 30 arrivé à New-York.

Le 31 visité M. de la Forest qui étoit prest à partir po. Albany. Demandé à voir M. Le C^{te} Dumortier, mais M. De la Forest me dit il étoit en campagne ainsi que M. Otto.

Le 1^{er} Aoust 1789, visité le jardin pres de New-York et je le trouvay en

assés bon état. Le jardinier avoit semé beaucoup de graines et planté beaucoup de jeunes arbres et arbrisseaux qu'il doit envoyer l'hyver suivant é é bien enracinés.

Le Dimanche 2 Aoust 1789 j'ay réglé avec le jardinier et je suis convenu avec lui des arbres et arbrisseaux qu'il doit envoyer l'hyver suivant.

Le 3 visité M. Willet petit fils du Docteur . . . et parti le même jour pour retourner à Philadelphie.

Le 4 arrivé à Philadelphie.

Le 5 le 6, le 7 et le 8 Aoust employés à placer une Lettre de Change pour obtenir les fonds dont j'avois besoin pour payer nos dépenses de voyage et pour pouvoir retourner à Charleston.

Le Dimanche 9 visité différents jardins, particulièrement celui de M. William Hamilton.*

Le 10 un accident arrivé à un de mes chevaux qui eut l'épaule et le genouil coupés d'une chute sur un Rocher m'obligea de chercher un autre cheval po. le remplacer.

Le onze je restai à faire panser mon cheval.

Le 12 j'allay visiter M^r Le Coulteux et il me vendit un Cheval 70 dollars.

Le 13, 14, 15 et Dimanche 16 furent employés à terminer mes affaires à Philadelphie.

Le 17 Aoust 1789 parti de Philadelphie pour aller prendre mes Chevaux que j'avois envoyés à la campagne chez M^r Bartram.

Le 18 la pluye m'empecha de partir.

Le 19 la pluye continua toute la journée.

Le 20 parti de très grand matin et couché à Wilmington petite ville dans l'Etat de la Delaware située à 30 miles de Philadelphie.

Le 21 passé par Christine-bridge Elk river.

Le sol est dans l'Etat de la Delaware moins bon qu'en Pensylvanie, moins argilleux et plus mêlé de sable. Remarqué le *Magnolia glauca* plus frequemment et la *Chionanthus* à 52 Miles de Philadelphie. Cette journée, notre marche fut de 27 Miles.

Le 22 passé la rivière Susquehanna et entré en Maryland, le sol arride, sablonneux et ferrugineux. Remarqué le *Fagus pumila* (Chinquapin) en abondance. Marche de 27 Miles.

Le Dimanche 23 arrivé à Baltimore, capitale de l'Etat de Maryland. Notre course fut de 24 Miles.

Le 24 Aoust 1789 Visité M. Le Chevalier D'Annemours consul de France,

Le 25 parti de Baltimore, notre marche fut de 34 Miles.

Le 26 passé par Bledensburg et par Alexandrie 1^{ere} ville de Virginie dont le commerce languit, malgré son heureuse situation sur la rivi. Potomack.

* Mr Hamilton's gardens were the most famous in the United States at the beginning of this century. Frederick Pursh, who later wrote a *Flora of North America*, superintended them during three years. The ground occupied by the Hamilton gardens now forms a part of Woodland Cemetery in West Philadelphia. A few rare and interesting trees planted by Hamilton still testify to his zeal and success as a planter.—C. S. S.

Cette ville est la patrie du Gen. Washington. Sa residence est à 8 miles au dessous de cette ville sur le bord de la rivière. Notre journée fut de 28 *M.*

Le 27 Aoust passé par Colchester petit hameau qui n'a rien de remarquable. Diné à Dumfries, petite ville composée de 8 à 10 Maisons de Marchands et d'environ 30 familles en totalité. Le sol est argilleux, mais froid et peu fertile dans cette partie de la Virginie. Notre marche fut de 30 *M.*

Le 28 passé par Fredericksburg petite ville assez agreable située sur la rive meridionale de la rivière . . . Notre course fut de 27 *Miles.*

Le 29 notre marche fut de 30 *Miles.*

Le Dimanche 30 Aoust 1789, arrivé à Richemont ; notre marche fut de 27 *M.*

Le 31 sejourné à Richemont.

Le 1^{er} Septembre parti de Richemont et passé par Petersbourg, petite ville mais commerçante ; sol entre Richemont et Petersburg, sablonneux. Mimosa . . . Hopea &c &c ; beaucoup de plantes des Carolines. Marche de 34 *Miles.*

Le 2 sol continuellement sablonneux, marche de 29 *M.*

Le 3 passé par Hick's foard dernière Court house de la Virginie, sol sablonneux et aride ; les maisons sont pauvres et les auberges très mauvaises, et arrivé à Halifax première ville de la Caroline septentrionale. Marche de 35 *Miles.*

Le 4 Septembre passé par Endfield Court-house ; sol sablonneux, longue suite de bois et de terres incultes. Marche de 21 *Miles.*

Le 5 passé par Dorchester-bridge sur Swift Creek, par Lamon's ferry : 30 *Miles.*

Le Dimanche 6 Septembre passé par Peacock's ferry sur Quotanckney Creek : 31 *M.*

Le 7 passé par White field ferry : 31 *Miles.*

Le 8 passé par Rock-fish, et par Washington town ; remarqué en plusieurs endroits la plante *Dionœa muscipula* dans les lieux stériles, sablonneux et humides : 28 *Miles.*

Le 9 Septembre 1789 passé par N. E. de Cap Fear et arrivé à Wilmington 34 *Miles.*

Le 10 visité Mr Ducher Vice-Consul de France et parti l'après midy. Après avoir passé trois rivières, remarqué à deux miles et demie de la ville, *Kalmia angustifolia*, *Dionœa muscipula* et un *Androm. nova species* : couché à Town Creek ; 10 *Miles.*

Le onze passé par Lock-wood folly et venu coucher à Little river sur les limites de la Caroline sept. et de la Caroline meridionale 40 *Miles.*

Le 12 passé par East end of Long Bay et couché dans une petite habitation sur le bord de la Mer : 25 *Miles.*

Le Dimanche 13 Septembre passé par West End of Long Bay et venu coucher sur le bord la rivière Santee. 32 *Miles.*

Le 14 le vent fut si considérable que nos n'avons pu traverser la rivière

qui a cinq miles de large en cet endroit. Le vent se calma la nuit suivante et nous passames à l'autre bord. Je payay 3 Dollards po. le passage de trois chevaux et 5 Dollards po. le Diner, le souper (d'eau chaude) de deux personnes et la dépense de trois chevaux et un negre. *4 miles seulement.*

Le 15 notre marche fut de *32 Miles.*

Le 16 voyagé l'espace de *28 M.*

Le 17 traversé la rivière Cooper et arrivé à l'habitation. *5 Miles.*

Total 190 Milles de Wilmington à Charleston.

Le 18 Septembre 1789, nous avons passé la journée à l'habitation pour nous reposer et pour reposer nos chevaux.

Le 19 j'ay été à Charleston ou M. Petry m'a remis les Lettres recues pour moi pendant mon absence.

Le Dimanche 20, mon fils en passant sur le chemin fut blessé dans l'œil, au bas de la Prunelle par un particulier qui tiroit alors une Perdrix.

Le 21 il fut saigné du bras par le Conseil du Medecin.

Le 22 le blanc de l'œil fut gonflé considerablement, et je pris le parti de le conduire à Charleston pour être à portée des Secours.

Le 23 le mal continua en empirant jusqu' au Dimanche 27 dudit. Dans cet interval je fis plusieurs voyages à la ville et je retournois à notre habitation po. veiller aux differens ouvrages du jardin que j'avois trouvé en assez mauvais état, et à la recolte de graines. Recueilli les Graines d'Illicium.

Le 30, il y eut quelques esperances de mieux, le Medecin ayant fait une incision, l'oeil fut moins enflé et l'inflammation diminua après un Cataplasme refrigerant que j'appliquay. Le chagrin auquel il s'abandoit étoit la cause que le mal alloit touj. en augmentant.

Le 1^{er} Octobre 1789 la pluye qui survint la veille me permit de preparer les arbres à être rentrés dans la terre en les mettant en Pots, et nous employames le temps à divers ouvrages essentiels au jardin.*

Le Dimanche 8 Novembre 1789, parti et couché à Monk's corner, *32 Miles* de Charleston.

Le 9 dudit, Dejeuné chez Jackson's Tav. 9 Miles. A 7 Miles de distance vu *Ilex angustifolia* : Arbres qui se trouvent le plus en abondance : *Quercus alba*, *Q. nigra*, *Q. nigra aquatica*, *Q. salicifolia*, *Q. rubra*, *Liquid. styraciflua*, *Nyssa aq.*, *Cratægus* . . . , *Nyssa dentata*, *Cupressus disticha*. Couché à Youta-Sprig, dix neuf miles de Jackson et *28 miles* de Monk's corner.

Le 10 Novembre passé la rivière Santee à 2 Miles de Youta spring et venu diner et coucher chez le Capitaine Deauty à *22 miles* de distance.

Le onze passé les sables steriles nomm. High hills, Santee, et dejeuné

* Here the regular Journal for this year stops, and what follows—from November 8, 1789, to December, 1789—is from loose slips of paper found in the end of the book. It will be noticed that there is a gap between October 1 and November 8, 1789.—C. S. S.

chez le nommé . . . Vu le *Philosoph. Le Fevre*. Vu dans les sables l'*Andromeda glauca*, couché à 16 miles en de ça de Camden chez la nommée Willow (jolie fille). 22 Miles.

Le 12. Nove. 1789 diné à Cambden, visité le Dr Alexander et couché chez le Capt Nettle à 6 miles de distance de Cambden. 22 Miles.

Le 13 Déjeuné à 4 M. de distance et nous avons couché auprès de Bear's Creek, chez le nommé Johnson 29 Miles et 7 Miles au de la hanging-rock.

Nota : cinq miles avant d'arriver chez . . . Johnson il y a une maison abandonnée au bas de la quelle le chemin fourche, la branche gauche de cette fourche mene aussi à Charlotte par le Maj. Bartley mais il y a 80 M. de Cambden par cette route.

Le 14 Novembre 1789 parti à 6 heures de l'habitation Johnson et arrivé à un Creek au dessus du quel est une maison dont la distance et de 6 M. de Johnson. Vu le *Triosteum*. Quatre miles plus loin se trouve une Plantation à gauche et un Creek à droite du chemin. Près de ce Creek vu sur le rivage élevé dud. Creek un *Viburn*. inconnu dont les f. dessechées m'ont paru à 3 lobes. Ce Vib. est de 2 à 3 pi. de haut et très mince de tige. Il y a 7 Mil. de ce Creek nommé . . . po. arriver à la Plantation de John Cry. Entre ce gros Creek et la Pl. vu un autre petit creek près du quel une espece de Poirier, arbuste inconnu. Cette journée 17 miles.

Le Dimanche 15 Novembre 1789 passé par une Plantation située à 8 M. de distance et 9 Miles avant d'arriver à Charlotte vu le *Triosteum*, *Clematis erecta* ; Sol alternativem^t argilleux jaune ou rouge, graveleux ; roches de granit et tres souvent du Quartz bien blanc et tres dur, communem^t il s'est trouvé du silex ferrugineux : Chêne rouge à long petiole, Chêne à longs petioles feuill. tomenteuses et chêne noir sont les plus communs ; sol cultivé produit Bled, Avoine et Mays. Sur les rives de la riv. Catawba il y est tres bon ; les herbes sont un peu meilleurs que dans les parties basses des Carolines mais les moutons ne sont pas tres beaux et les autres bestiaux peu gras.

Arrivé le soir à Charlotte en Mecklembourg county dans le Carol. sept. 25 miles. Deux cents Miles de Charleston.

Le 16 Novembre 1789 passé la rivière Catawba au lieu nommé Tack-à-segee foard 14 miles de Charlotte ; deux Miles avant d'arriver à ce foard nous trouvames un arbuste inconnu à f. opposées et nous avons été coucher chez le nommé Peter Smith ; deux (un) miles avant d'y arriver, vu près d'un Creek au bord du quel il y a des *Ilex* et *Kalmia*, un *Magnolia glauca** *foliis longissimis et cordatis et fructibus globosis, et ramis albicantibus acumine sericeis*. Ce *Magnolia* est d'une stature moins haute que les autres espèces connus. Cette journée fut de 26 miles.

Le 17 Novembre 1789, nous avons passé par Lincoln Court house 12

* *M. macrophylla* Michx? The locality "in regionibus occidentalibus fluvio Tennessee trajectis" given in his Flora for that species, however, may well indicate that Michaux referred to some other *Magnolia* in this entry in the Journal.—C. S. S.

miles et nous avons été coucher chez le nommé Henry Watner 16 M. de Lincoln, en tout 28 Miles.

Le 18 Novembre 1789 gelée blanche tres sensible. Trouvé le pays montagneux et les roches d'un Granit composé de shorl, quartz et mica, mais plus souvent de Quartz ou bien de silex ferrugineux et argille dans les pierres peu dures. Arrivé à Burke court house. Vu deux Miles avant d'y arriver, l'arbriss. inconnu de la rivi. Catawba. 29 Miles.

Le 19 Novembre 1789 parti de Burke et passé chez le Colonel Avery dont l'habit. sur la riv. Catawba à 3 miles de Burke. Trouvé un peu avant d'y arriver dans les Creeks un Astragalus nouveau et un Menispermum à fruit noir ; couché à 12 Miles de Burk.

Le 20 nous avons déjeuné à 6 M. plus loin et vu Magn. cordata, Jugl. oblonga, et nous arrivames ensuite à Turkey-cove. En chemin remarqué Epigea procumbens et Gaultheria procumb. 15 Miles du lieu ou nous avons couché jusqu'a Turkey-Cove.

Turkey Cove est le point de station d'ou l'on peut aller en differents endroits sur les hautes Montagnes.

Le 21 visité la branche septentrionale de la riv. Catawba. Vu un Andr. arborea de 43 pouces de circonference.

Le Dimanche 22 recueilli et ramassé sur les hautes montagnes des Glands de Chêne glauque.

Le 23. parti pour les hautes Montagnes. Vu un Andr. arb. de 49 po. de circonference.

Le 24 Novembre 1789 passé sur les Blue Ridges de la Caroline Sept.

Le 25 arrivé sur les parties basses de la Montagne Noire et recueilli *Azalea fulva*, *Azalea nova species* &c.

Le 26 recueilli *Magnolia cordata*, *M. acuminata* &c. &c.

La 27 Arrivé aux Cataractes meridi. de Taw river et recueilli *Viburnum nova species*. Gelée et neige.

Le 28 Novembre 1789, Degel et Pluye toute la journée.

Le Dimanche 29 revenu à l'habitation du S^r Ainsworth.

Le 30 j'ay recueilli les *Kalm. latifolia* et *Rhododendron*.

Le 1^{er} Décemb. et jusqu'au 5 dud. visité plusieurs hautes Montagnes et ensuite emballé mes Recoltes à la quantité d'environ 2500 arbres, Arbriss. et Plantes, en tout 7 caisses.

(Remember to call at Capt. Smith, the 2^d house below M^{ter} Seagrove and get lett. directed to Captain Stafford.)

Le 9 Décembre 1789 passé par Burke court house.

Le . . . arrivé à Charleston.

CAHIER 6. SUITE DE 1790—1791.

Le 31 Decembre 1790, le temps fut très couvert, il tomba une si grande quantité de neige depuis 4 heures du matin jusqu'a 5 heures apres midy, que la terre fut couvert à la hauteur de six et de 8 pouces dans la campagne et 6 pouces dans la ville.

Je travaillay tres peu à l'emballage des graines que je me proposois d'envoy. en France par le Ship Pennsylvania Capt. Dav. Harding destiné po. le Havre de Grace.

Le 1^{er} Janvier 1791, je continuay à préparer l'envoy de graines. M^r Godart chancelier du Consulat de Charleston étoit venu passer q. ques jours avec moi sur l'habitation. La gelée qui depuis 14 jours avoit continué, redoubla vivement.

Le Dimanche 2 dud. continué le même travail.

Le 3 M. Godart partit po. Charleston et il me renvoya l'information que le navire destiné po. le Hav. ne devoit partir que le 6 suivant. Je recus la nouvelle que les Americains avoient envoyé des troupes 1453 hommes contre les Sauvages Miami ; il y eut environ 100 Sauvages tués mais la perte des Am. se monta 183 tués et 31 blessés. Je continuay mon travail des graines.

Le 4 je travaillay à l'emballage des arbres po. le Roy et po. *Monsieur*.

Le 5 la neige a disparu. J'écrivis mes Lettres pour annoncer l'envoy et je partis le soir pour Charleston.

Le 6 Janvier je fis embarquer les caisses, je reglai avec le Capitaine le prix du fret, je terminay mes Lettres et je revins à l'habitation le 7 dud. au soir.

Le 7 je recus avis d'aller accompagner le Major Mitchell dans un Canton de l'Etat ou il avoit reconnu une nouvelle Plante.

Le 8 je partis pour visiter les rives de la rivière Santee depuis env. Maurice-ferry jusque vers son Embouchure. Les rives de cette rivière sont défrichées en grande partie po. la culture du riz. La plupart des habit. vivent assez mesquinement et chez les plus riches Planteurs je n'y a pas mangé de Pain, mais de la bouillie de Mays (nommée . . .) et du Porc salé. Mes chevaux ont vecu de fourrage de Pois ou de Mays.

Toute la semaine fut employée à cette excursion et je revins à l'habitation le Dimanche 16 de Janvier. Le principal fruit de ce voyage fut la découverte d'un Andromeda à f. glauques qui se trouva à la distance de 38 à 40 Miles de Charleston et seulement 30 Miles de l'habitation que j'ay établi en Caroline. Pour le trouver en abondance il faut, en partant de Charleston aller passer par Strawberry-ferry et suivre la route de George-town par Lenews-Ferry (dit Winingham ferry) à la distance de 10 Miles environ de Strawberry, en continuant la grande route, on reconnoit cet Andromeda dans les Swamps étroites qui se rencontrent frequem^t au milieu des Pinieres steriles de la Caroline. Ces Pinieres sont des étendues immenses d'un sable aride ne produisant que des Pins. Il s'y est formé par les Pluyes des ruisseaux bourbeux, qui charient l'eau aux rivières pendant et après les Pluyes. Ils contiennent une eau crouissante étant retenus par les feuilles et les autres débris de la végétation. Dans ces parties presque toujours humides, on y trouve les différentes espèces d'Andromeda, les Laurus borbonia, les Azalea, les Magnolia glauca, les Gordonia &c &c &c-

Le 17 Janvier j'ay été à Charlest. et je recus une lettre de mon fils dattée du mois d'Avril de l'année précédente.

J'écrivis à M. l'Abbé Nolin sur les difficultés de trouver à placer les Lettres de change et que si ces difficultés continuoient je serois obligé de repasser en France. J'écrivis a mon fils par la même occasion du Capit. David Harding.

Le 18 et les jo. suivants jusqu'au 22 dud. il ne se fit aucun ouvrage sur l'habitation, les Negres ayant été obligés de travailler aux communes de la grande route.

Le 22 j'eus la visite de M^r Frasier,* il parut que la bonne reception qui lui avoit été faite en France l'avoit rendu plus honnête, il se loua beaucoup de la France. Il desira que je l'informe des nouvelles Plantes venues à ma découverte et que je lui fasse part de q.ques unes de mes nouvelles Plantes. Mais connoissant que son objet est de vendre, je ne lui donnay rien et je m'en tins à lui faire la meillure recept. possible.

Le Dimanche 23 je fus occupé à réunir plusieurs especes du genre *Andromeda* dans la Pépiniere.

Le 24 Janvier 1791. J'ay été à Charlest., il n'y avoit alors aucun navire destiné pour France, et ayant acheté des Planches, je revins le même jour. Il avoit gelé à glace.

Le 25 je fis travailler dans la Pépiniere, le vent étoit passé au sud ; on fut occupé principalement à reparer les Clotures.

Le 26 même travail à reparer les Clotures et à rassembler dans la Pépiniere une collection d'And. sçavoir *Andromeda arborea*, *And paniculata*, *coriacea*, *Mariana*, *nitida*, *racemosa*, *serrata*, *calyculata*, *Wilmingtonia*, *polifolia*, *formosissima*.

Le 27, 28, et 29 travail. a réparer les Clotures du jardin et de la Pépinière.

Dimanche 30 analysé le *Betula alnus* † et *Ulmus Americana*.

Le 31 travaillé à arracher les arbres du Jardin. et à les transplanter dans la Pépiniere.

Le 1^{er} février 2. 3. 4 et 5 dud. continué la collection des arbres d'un même genre dans le Pepiniere.

Le Dimanche 6. les negres ont été occupé à aider un habitant voisin dont la maison étoit en feu.

Le 7 travaillé à la collection des arbres d'un même genre dans la Pépiniere et j'ay fait reponse à M^r De la Forest, dont j'avois reçu une Lettre deux jours auparavant ainsi que de M^r l'Abbé Nolin et de mon fils.

Le 8, 9, 10, 11 et 12 fevrier, continué le même travail dans les Pépinières.

Le Dimanche 13, greffé des Pruniers de Perse sur des Pruniers communs de ce Pays-cy.

Le 14 analysé la floraison de l'Erable rouge de Caroline dont les fl. hermaphrodites ont 5 étamines et les fl. mâles aussi 5 étamines.

Le 15 le Prunier écarlate de Perse a fleuri dans mon jardin, le Prunier

* Pruser.—C. S. S.

† *Alnus serrulata*, Willd.—C. S. S.

Chicasaw a fleuri cette semaine. La nuit du 15 au 16 il y a eu grand vent et pluie considérable ; le vent a passé du sud à l'Ouest.

Le 16 février 1791, l'air s'est éclairci et le vent a passé de l'Ouest au Nord. La nuit du 16 au 17 il y a eu tempête, vent furieux, et plusieurs parties de la clôture du jardin ont été renversées.

Le 17 travaillé à réparer les clôtures. Ce matin la gelée étoit à 5 degrés du thermomètre de Reaumur.

Le 18 gelée à 6 Degrés, discontinué les Plantations pour réparer les clôtures brisées par les vents.

Le 19 continué à réparer les clôtures.

Le Dimanche 20 herborisé et analysé plusieurs Plantes.

Le 21. 22. 23. 24. 25 et 26. Planté les arbres dans les Pépinières.

Le Dimanche 27 herborisé.

Le 28 j'ay été à Charleston.

Le Mardy 1^{er} Mars Planté les arbres dans la Pépinière.

Le 2 achevé la réunion des arbres d'un même genre dans la Pépinière.

Le 3 planté dans le jardin par ordre les Plantes bulbeuses et différentes Plantes herbacées des Montagnes et des autres parties de la Caroline.

Le 4 travaillé à mettre en ordre mes herbiers et commencé par les collections de New-York, du N. Jersey et de la Pensylvanie.

Le 5 et 6 continué la même travail.

Le Dimanche 6 Pluye, semé plusieurs sortes de Graines.

Le 7 Mars continué à mettre en ordre mes herbiers ; Recu une lettre de mon fils datée le onze Juillet de l'année dernière. Recu une lettre de M. Bartram et une lettre de M. Hamilton.

Le 8 préparé une caisse de Plantes po. *Monsieur* Frère du Roy par la voie de Bordeaux, recommandé au capit. Baas et à Bord à M. P. Texier.

Le 9 écrit mes Lettres à M. Le Monn. à mon fils &c. &c.

Le 10. 11. et 12 travaillé à mes herbiers.

Le Dimanche 13.

Le 14 Mars j'ay été à la ville.*

Le Dimanche 17 Avril 1791. Embarqué po. aller à S^{te} Marie (Avril a 30 jours).

Memento. Il se trouve autour du 1^{er} pin après avoir passé le Swamp aux Vaccin. repens, une bonne quantité de Vaccin. stamineum. Auprès de la clôture à Dillon, beaucoup de Viburnum. . . . L'And. axill. se trouve abondamment au bout du champ à main droite chez Williman environ 200 toises avant d'arriver au bout. Le Magn. trip. et Lianne gynandriq. à l'opposite de la remise du bois en venant d'Ashley-ferry.

Le 19 Avril au soir, arrivé sur l'isle de Cumberland, vis à vis de S^{te} Marie.

Le 20 herborisé sur l'isle Cumb.

Le 21 j'ay été à S^{te} Marie dit New-town.

Le 22 j'ay passé la journée sur l'habit. du capit. Stafford.

* Here this part stops, and what follows is from loose slips of paper placed in the end of book. There is a gap between March 14 and April 17.—C. S. S.

Le 23 je me suis embarqué pour aller visiter les rives de Settella river.

Le Dimanche 24 Avril herborisé aux environs du nommé James Moore.

Le 25 resté sur le même lieu.

Le 26 je suis parti pour aller aux parties élevées du Settella river. 17 Miles de Marche.

Le 27 les chevaux égarés, je suis resté chez le nommé Crawford à 3 miles du M. Right qui tient le flatt * po. passer la riv.

Le 28. marché 16 Miles et quitté les habitations, campé auprès d'une demeure d'Indiens chasseurs.

Le 29 Avril arrivé au magasin établi po. la traite avec les Sauvages et herborisé toute la journée.

Le 30 reconnu le Nyssa Ogechee tout le long de la Riv. S^{te} Marie et particulièrement sur l'habitation du nommé . . .

Le Dimanche 1^{er} May descendu la riv. dans un Boat et trouvé un Sarcenia nouvelle espece. Reconnu à environ 18 M. de S^{te} Marie le Pisonia baccifera.

Le 2 May arrivé à S^{te} Marie dite New-town. et herborisé aux environs. Le soir revenu sur l'isle de Cumberland.

Le 3 j'ay loué deux hommes et un Cannot po. aller sur la terre ferme ou j'ay recueilli en abondance des Plantes de l'Andromeda ferruginea, Kalmia hirsuta et Befaria &c.

Le 4 herborisé sur l'Isle et emballé le reste de mes Recoltes.

Le 5 May le vent contraire a empêché le Capit. de mettre a la voile. Reconnu sur l'Isle de Cumb. deux endroits produisant le Pisonia.

Le 6 le navire mit a la Voile po. Charleston. Le soir il s'eleva une tempête, le tonnerre et les éclairs continuerent la nuit suivant, le vent ayant varié plusieurs fois, nous nous trouvâmes vis a vis de St. Augustin en Floride.

Le 7 apres beaucoup de difficultés et de fatigues nous revimes a l'Isle de Cumbetland.

Le Dimanche 8 May herborisé et analysé les Plantes de cette partie de la Georgie.

(At Middleton's place 3 miles from Dorchester the Cork-tree is to be seen. Inquire of the ovrseer.)

Le 13 embarqué de nouveau.

Le Dimanche 15.

Le 16 relaché dans la riv. Savanah à cause des vents contraires.

Le 17 entré à Savanah et herboriz. aux environs de cette ville.

Le 18 herborisé dans les camps a une grande distance et reconnu un arbrisseau qui se rapporte au genre Mussanda.

Le 19 herborisé aux environs du Fanal construit sur le bord de la mer po. la sureté des Navires.

Le 20 May 1791. le navire a descendu la riv. et fut en pleine mer.

Le 21 nous fumes retenu par les calmes à l'entrée du havre de Charleston.

* Flat-bont ?--C. B. B.

Le Dimanche 22 May. Entré à Charleston et reçu les Lettres de . . .

Nota : Promis à M^{er} Belin un demi Bois de Riz et des Gr. du Riz sac de Guinea gross. . . . Il m'a promis de m'envoyer des Gr. de Papaw.

Promis à M. Bleyrn des Gr. de Pentapetes. Il m'a promis de m'envoyer des Graines l'Ipomœa qui ont réussi dans le jardin du nommé Clark. to the care of Francis P. Fatis.

Le nommé Andrew . . . sur Crooked riv. m'a promis de me recueillir des Gr. de Palmeto a 2^{sh.} le Peck. et je dois lui envoyer une caisse d'avance av. de la mousse.

Le Saururus cernuus est reconnu très bon remede po. meurir les playes qui viennent à suppuration et en diminuer l'inflammation. On fait bouillir les racines ou les broye, on y ajoute un peu de farine de froment pour en faire un cataplasme. On fait aussi usage de miel et de farine de Mays, pour meurir les playes qui tendent à suppuration.

Memento : Ne pas oublier à préparer plusieurs Planches continuées po. y planter les Plantes de Bahama et de la Floride de manière à passer l'hyver : Préparer aussi un Abri au Nord. pour les Plantes des Montagnes : Rassembler plusieurs espèces de Viburnum po. greffer la Vi's. tinus et particulièrement la Vib. cassinoides. Préparer immédiatement de chassiss pour les Kalmia et les Rhododendrons : Acheter un Baril de Goudron : faire une Cloture droite av. fossé derri. le jardin pour les chev. et vaches : Outre l'ombre mettre des longues shingles pour éloigner la pluye de mes arbriss. au nord.

De S^t Augustin à Cow-ford ferry sur S^t John tenu par Pritchard. 36 M.

De Cow-foard à l'habitation du nommé Allen sur S^{te} Marie 46 M.

D'Allen au ferry de Brown sur Settella river

De Brown ferry à Ridge Bluff sur la Rivierre Alatomaha.

D'Alatomaha à Savanah

De Savanah à

CAHIER 7. 1792 & PART OF 1793.

Le 27 Mars 1792, l'habitation de Caroline a été vendue à vente publique au prix de 53 Guinées qui font la S^e de 247 dollars.

Le Avril passé l'acte d'acquisition faite par M. Himely.

Le 17 Avril écrit a M. De la Porte, Ministre de la Maison du Roy pour lui envoyer la récapitulation de mes Depenses. et des S^e touchées depuis mon Depart po. les Etats-Unis.

Le même jour 17 Avril tiré sur M. l'Abbé Nolin une traite de 3000 lv.

tournois évaluée à 555 Doll. Ecrit à mon fils par duplicata pour lui annoncer mon Départ de Charleston po. Philadelphie.

Cette traite m'a été rendue par M^r De la Forest qui n'a pas pu en faire les fonds et je lui en ay donné une autre de 1200 lv. sur ma famille datée de Philadelphie.

Le 18 Avril 1792 Embarqué à Charleston sur le Charleston Packet po. Philadelphie et arrivé à Philadelphie le Mardy 25 dud. au soir.

Le 26 visité M. De la Forest Consul, qui n'a pas voulu accepter la traite de M. Petry.

Le 27 visité M^r James et Shoemaker, M. Pinckney, M. Morphy, M^r . . .

Le 28 terminé avec M De la Forest le compte des Sommes dont il s'étoit chargé pour les avances à faire au jardinier Saulnier sur la dernière traite du 30 Novembre 1791.

Visité M. De Ternan, Ministre de France pres les Etats-Unis.

Visité M. De Brahm, Surveyeur des Colonies angloises.

Visité M^{ess}. Bartram Botanistes.

Le Dimanche 29, Ecrit plusieurs Lettres et redigé mes comptes po. les envoyer en France.

Le 26 Avril 1792. Visité M^r Izard ; le Doct. Benjamin Rush, Physician, le major Th. Pinckney, le D^r Barton, M^r De Ternan et diné chez M^r De Brahm.

Le Mardy 1^{er} May écrit des Lettres po. Charleston.

Le 2 visité M Hamilton.

Le 3 Visité le D^r Benjamin Smith Barton, physicien in Philad^a.

Le 4 visité M. De Bauvois.

Le 5 à 26 . . .

Le Dimanche 27 May Parti de Philadelphie par la route d'Amboy et arrivé à New-York le 29, a 10 heures du Soir.

Festuca en Caroline et en N. Jersey, Pensylvanie &c. Festuca gluma 2 valvis multiflora, Cal. 2 valvis, v. lanceolatis mucronatis.

Le 30 Visité l'Etablissement de New-Jersey pres New-York et herborisé aux environs.

Celastrus : Cal. 5-partit. lacin. oblongis, obtusis, erectis : Pet. 5, ovata, superne reflexa : stam. 5, filam. erecta, Anth. oblongae, erectae : Germen parvum receptaculo immersum : Styl. o, Stigmata 3.

Saxifraga Pennsylvanica fl. en panicules,

Saxifr. nivalis.

Le 31 May 1792 continué les recherches botaniqu.

Vaccinium hispidulum * fol. ovatis, integris, hispidis ; florib. calyculatis octandris germine infero, fructu albo. V. flores uniflori, axillares breve pedunculati : Germen inferum, basi foliola duo calycina ovata opposita. Cal. 4-fid. lacin. ovatis, apici germinis approximatis persistentib. Cor. campaniformi, patens 4-fida, lacinis apice reflexis, Stam. 8, filam. brevis-

* *Chloages hispidula*, Torr. & Gray.—C. 8. 8.

sima: Anth. erecta, Germ. subrotundum, inferum: Stylus staminibus longior, stigma obtusum: Pericarpium bacca nivea subovata umbilicata, stylo persistente, semina plurima fol. ovata integ. acuminata, breve petiolata, alterna, subtus aspersa pilis ferrugineis ut et caulis. Caules repent. radicantes, filiformis, fructus parvi, nivei. Habitat in cupressinis humidis, Canadæ et Novæ Angliæ, New-York, Novæ Cesareæ &c. *Atoca* a fruit blanc.

Vaccinium . . . Cranberry *Atoca* a fruit rouge mangeable.*

Hydrophyllum Virginicum, *Saxifraga nivalis*, *Pennsylvanica*; *Trillium cernuum*, *Trientalis*.

Le 2 Juin parti de N.-York pour New Haven en Connecticut distante de 98 Miles de New-York.

Le 3 arrivé à 10 heures du Soir.

Le 4 parti pour aller visiter M. Peter Pound voyageur qui a demeuré 19 Ans dans l'intérieur de l'Amérique ou il a voyagé à l'Ouest jusqu' aux Lacs de la Pluye, Lac des Bois, Lac Winipique, Riv. Winipique, Lac Manitopa. Selon M^r Pound il faut être à la fin d'avril à Montreal po. aller avec les Canadiens à la Traite.

Le 5 Juin parti de Milford et revenu coucher à New Haven.

Le 6 parti à 5 heures du soir et arrivé le 7, à 4 heures du matin à New-York. Le dit 7. je me suis préparé à partir pour le Canada.

Le 8 au soir parti à bord d'un Sloop po. Albany.

Le 9 herborisé à 18 Miles de N. York. tandis que le Sloop étoit à l'ancre à cause du vent contraire.

Cornus ramis punctatis, *Geranium* . . . , *Geranium*. . . . , *Lupinus perennis*, *Verbascum blattaria*.

Le 10 Vent contraire.

Le 11 au Matin, passé entre les Montagnes de roches sur lesquelles on voit les retranchem. de plusi. Batteries placées pendant la guerre. L'endroit de ces Montagnes le pl. remarquable est nommé West Point. Ces Montagnes tres rapprochées, dans un endroit de la rivière y est resserré de manière que le passage étoit fermé av. une Chaine qui traversoit la rivière. Le soir arrivé devant Poughkeepsie. Aupres de cette ville vu le *Juniperus Europea*? *Thuya canadensis*.

Le 12 Juin le vent du Nord fut plus considérable et le froid très vif, Thermometre de farenheit à . . . degrés; à 5 heures du Matin. Ce même jour nous avons passé devant Esopus.

Le 13 le Vent devint plus favorable.

Le 14 nous arrivames à Albanie distant de 164 Miles de New-York.

Le 15 Juin parti po. le lac Champlain et venu coucher à Lasingburgh.

Le 16 et Dimanche 17, herborisé sur une haute montagne, pres de ce lieu. *Panax quinquefolia*, *Acer pensylvanica*, *Fumaria vesicaria scandens*, *Mitella diphylla*.

Le 18 parti de nouveau et arrivé à Saratoga.

* *Vaccinium oxycoccus* L. and *V. macrocarpon*, Ait.—C. S. S.

Le 19 arrivé à Skeensborough, 10 miles avant d'y arriver, observé *Linnea borealis*, *Taxus* . . . ; *Trientalis*, *Gaultheria procumbens*, *Helleborus trifolius*.*

Le 20 Embarqué sur le Lac Champlain : Vent contraire l'espace de 60 Miles et plus. tres resserré par les Montagnes qui bordent le Lac.

Le 21 à 4 heures du Matin, passé devant Ticonderoga cy devant Fort Carillon : *Hyppophae canadensis*.†

Le 22 Vent contraire et calme : herborisé toute la journée : *Arbutus acadiensis*.

Le 23 arrivé devant Burlington ; sur la main droite l'on aperçoit une très haute Montagne située a 20 M. environs dud. Burlingt. dans l'Etat de Vermont.

Le 24 herborisé sur le coté oriental du Lac faisant partie de l'Etat de Vermont ; Arrivé le même jour à Cumberland Head.

Le 25, 26 et 27 herborisé en attendant une occasion pour continuer mon voyage.

Plantes remarqués sur le lac Champlain :

Pinus abies canadensis : *Pinus foliis geminis* : *Pinus Strobus* : *P. fol. undique sparsis* : *Thuja occidentalis* : *Taxus monoica* : *Betula papyrifera*, *nigra*. *Ulmus* . . . *White elm*. *Carpinus* . . . *Red elm*. *Lonicera diervilla*, *Lonicera* . . . *L. . . . L. glauca* : *Spiraea* . . . *Viburnum nudum*, *V. . . . V. . . . V. . . . Fagus sylvatica americana* : *Hyppophae Canadensis* ; *Actaea spicata*, *Vaccinium stamineum*, *V. corymbos.* *V. resinoseum*, *V. . . . Arbutus Acadiensis*, *Circaea Canadensis*, *Collinsia Canadensis*, *Iris coerulea*, *Carex* : *Gramina*, *V. l'herbier* ; *Cephalanthus occid.*, *Houstonia purpurea*, *Galium* . . . *Gal. album*, *Cornus 1, 2, 3 especes* ; *C. herbacea*, *alternifolia* ; *Fagara* . . . *Hamamelis Virginica* ; *Cynoglossum* . . . ; *C. officinalis* ; *Symphytum officinale* ; *Lysimachia 4-folia?* ; *Campanula* . . . ; *Lonicera (Chamaeceras)* ; *L. (glauca scandens)* ; *L. Diervill.* ; *Verbascum thapsus* ; *Rhamnus (dioicus)* ; *Ceanothus Americanus* ; *Celastrus* . . . ; *Ribes cynosbati* ; *R. (miquelon)* ; *Vitis* . . . ; *Thesium umbellatum* ; *Asclepias* . . . ; *Ascl. . . .* ; *Sanicula* . . . ; *Rhus glabrum* ; *Rh. . . .* ; *Rh. . . .* ; *Viburnum . . .* ; *Sambucus . . .* ; *Staphylea trifoliata*, *Aralia racemosa*, *nudicanlis* ; *Lilium Philadelphicum*, *Canadense* ; *Uvularia perfoliata* ; *U. . . .* ; *U. . . .* ; *Hypoxis erecta* ; *Leontice thalictroides* ; *Convallaria polygonatum maximum*, *bifolia* ; *Prinos verticillatus* ; *Medeola Virginica* ; *Trillium erectum* ; *Trientalis* . . . ; *Dirca palustris* ; *Andromeda paniculata* ; *Epigea repens*, (a 20 miles avant d'arriver au Lac Champlain) : *Gaultheria procumbens* ; *Arbutus Acadiensis* ; *Pyrola umbellata* ; *P. . . . Helleborus trifolius* ; *P. . . .* ; *Mitella diphylla* ; *Oxalis* . . . ; *Asarum Canadense* ; *Prunus* . . . ; *Padus Virgin* ; *Cerasus* . . . ; *C. . . .* ; *C. . . .* ; *Crataegus* . . . ; *Cr. . . .* ; *Mespilus Canadensis arborea* ;

* *Cypripis trifolia*, Ballab.—C. S. S.

† *Shepherdia Canadensis*, Nutt.—C. S. S.

M. Canad. frutescens; Spiraea . . . ; Rosa . . . ; Rubus occidentalis, odoratus, arcticus, hispidus, Canadensis; Potentilla . . . ; P. . . . ; Geum . . . ; Actea spicata, . . . ; Sanguinaria Canad.; Podophyllum peltatum; Nymphaea . . . ; Tilia Americana; Cistus Canadensis; Aquilegia Canadensis; Anemone hepatica, dichotoma &c. Thalictrum purpurascens, dioicum; Pedicularis Canad.; Ped. . . . ; Chelone glabra, hirsuta; Scrophularia; Linnea borealis; Orobanche Virginica; Draba bursa-p.; Lepidium; Geranium; Fumaria sempervirens; Fum. vesicaria; Polygala Senega, viridescens; Hedisarum; Trifolium rubens, . . . ; Hypericum; Eupatorium; Gnaphalium dioicum; Lobelia sphyllitica; Viola . . . ; Impatiens . . . ; Cypripedium; Carex; Betula papyrifera, nigra; Urtica . . . ; Sagittaria sagittifolia; Quercus . . . ; Juglans oblonga; Fagus sylvatica am. Carpinus . . . ; Pinus fol. binis, P. fol. ternis, P. fol. quinis, P. fol. apice emarginatis, P. fol. denticulatis, P. fol. fasciculatis, P. fol. undique insertis; Thuya occidentalis; Hippophae Canadensis; Myrica gale; Fagara . . . ; Smilax herbacea, . . . , Populus balsamifera, P. . . ; Menispermum; Juniperus Virginiana, communis; Taxus monoicus; Veratrum; Acer rubrum, sacchariferum Canadense, A. Pennsylvanicum; Fraxinus; Panax quinquefolia; Equisetum. . . . ; Osmunda

Le 27 Juin parti de Cumberland Head et relâché à la Pointe aux Fers.

Le 28 parti dans un petit canot et entré sur le territoire anglois à cinq heures du Soir.

Le 29 arrivé et débarqué à St Jean. Après diné j'ay loué une voiture po. aller à la Prairie petite ville située sur le fleuve St Laurent

Le 30 Passé en Bateau a Montreal. Visité plusi. personnes po. qui j'étois muni de Lett. de recommandation.

Le Dimanche 1^{er} Juillet herborisé sur une Montagne pres de Montreal.

Le 2 Visité le Capit. Hughes Scot. du 26^e Regiment amateur de Minéralogie.

Le 3 herborisé dans la Campagne et dans les Prairies basses. Reconnu deux nouveaux genres 1^o : Un genre intermediaire entre le Typha et Sparganium, plante hermaphrodite à 3 Etam. amentum cylind. cylindrique & . . . 2^o. Un genre entre Morœa et Antholisa planta aquatiq. 3 etamines &c.

Le 4 Passé la Matiné avec le Capit. Scott entrenu de voyages, Botaniq. Minéralogie &c. . . .

Le 5 Juillet herborisé : Alisma . . .

Le 6 Diné chez M. Frobicher.

Le 7 Diné chez M. Henry.

Le Dimanche 8 herborisé au bois de la chine, Dianthera nova et Hypericum novum dans l'espace d'une lieue en remontant la rivière.

Le 9 reçu la visite de plusi. personnes.

Le 10 diné chez M^r Frobicher avec les officiers des deux Régimens en garnison à Montreal. Remarqué le Major Murray du 60 Regim^t : le capitaine Robinson, le capt. Scott & &c. par leurs merites.

Le 11 Embarqué : le 12 Vent contraire.

Le 13 relaché à William Henry cy devant Sorel petite ville à l'embouchure de la riv. Chamblis.

Le soir vent favorable, traversé le lac S^{nt} Pierre. Herborisé auprès de Sorel. *Andromeda calyculata*, *Kalmia angustifolia*, *Vaccinium corymbosum*. Vac. . . . *Calla palustris*, *Aralia nova*, *Vaccin. repens staminib. octo.*

Le 14 herborisé à 8 li. de distance des Trois Riv. dit Baptiscan ; plus bas *Andromeda polifolia*, *Kalmia glauca*, *angustifolia* ; *Azalea glauca*, *Ledum palustre*, *Comarum* . . . ;

Le Dimanche 15 herborisé : *Triglochin Scheuchzera* . . . Vent contraire.

Le 16 arrivé à Quebec.

Le 17 visité le Gouverneur Clarke : herborisé : *Oxalis nova species* &c. &c.

Le 18 Juillet visité le Juge . . . Dodd. herborisé : *Lycopodium* cinq especes differentes ; *Aconitum uncinatum** vulgairement Tisavoyanne.

Le 19. Vu M^r Neilson Imprimeur, homme très instruit. Recueilli plusi. especes de Graines ; *Convallaria* . . . *Cornus canadensis*, *Aralia nudicanlis*. *Sambucus fructu rubro*. Th. le matin 70 D. une heure apres Midy . . . 90.

Le 20 thermometre de Fareinhit ; le matin 67 degrés, herborisé : *Convallaria stellata*, *trifolia*, *bifolia*, *duo alteræ species*, *Lycopodium* 6 especes différentes.

Le 21 Thermometre le matin 51 ; herborisé *Arbutus uva ursi*, *Arbut. nova sp.* *Sorbus aucuparia* ; *Narthecium calyculatum*, † *Euphrasia odontites*, *Plantago maritima*, *Actaea spicata fructu albo*, *fructu rubro* &c. &c.

Le 22. Visité M^r le D^r Nooth : vu dans son jardin des framboises du cap de Bonne Esp.

Le 23 Déjeuné chez le D^r Nooth ; Vu un soufflet double de son invention pour continuer la flamme de la fusion des mineraux, du verre po. les thermometres &c.

Le 24 le D^r Nooth m'a fait voir le moyen d'adapter des Pincés de Telescope pour voir les petits objets aussi bien qu'avec un microscope. Il n'y a rien de plus avantageux pour cela. Les objets sont vus très distinctement à des degrés plus ou moins éloignés sans fatiguer la vue au lieu que par les Microscopes ordinaires. Si l'on regarde une fleur même très petite, l'on peut voir aussi distinctement dans l'interieur de la corole qu'à l'extrémité, &c. &c.

Le 25 fait plusi. demarches po. me préparer au voyage dans l'interieur des Terres.

Le 25 herborisé à la Cascade de Montmorency : Plantes remarqués ;

* ?—C. S. B.

† *Tuffetia glutinosa*, Willd.—C. S. B.

Pinus balsamea, *Pinus abies*, Sapinette rouge, Sapinette blanche ; *Thuya occidentalis* ; *Larix* ; *Betula papyrifera* ; *Pinus balsamea*.

Le 27 diné chez le D^r Nooth.

Le 28 herborisé dans les bois à droite de la petite rivière S^t Charles. *Andromeda calyculata*; *Kalmia glauca*. *K. angustifolia*; *Ledum palustre*; *Sarracenia purpurea*; *Azalea nova species*.

Le Dimanche 29 herborisé à Lorette.

Le 30 préparé au voyage du lac Mistassin.

Le 31 Juillet parti de Quebec, passé devant le cap. Tourmente et le Cap brulé, situé l'un à 12 lieues de Quebec, et l'autre à 14 li. Reconnu sur les Montagnes: *Juniperus communis*, *Thuya*, Sapins et Epinettes, *Epigea repens*, *Linna borealis* &c &c : Minéraux Roches composées de Quartz, de Mica et de Schorl.

Le soir arrivé devant la Baye S^t Paul distante de 17 lieues. L'on voit l'Isle aux Coudres estimée à 18 lieues de Quebec. A l'entrée de la Baye vu un Loup marin et plusieurs Marsouins l'un de couleur blanche comme de la neige.

Le 1^{er} Aoust vers une heure du matin, le Vent a changé; et à 3 heures une Pluie considerable qui a continué jusqu'à 10 heures: Herborisé sur les Montagnes; *Ledum palustre* et *Kalmia angustifolia*: *Populus balsami*.

. . . *Potentilla nivea*; *Calla palustris* aux lieux marecageux ainsi que *Vaccin. repens album*, *V. atoca*; * *Drosera*; *Hordeum murinum*; *Galium album*; *Typha altissima*; *Spargan. erectum*; *Potamogeton* &c.

Le 2 Aoust arrivé à la Malbaye; *Cynoglossum seu Pulmonaria maritima*; † *Glaux*?; *Hippophae canadensis*; *Sisyrinchium bermudiana*; *Galium album*; *Abies fol. undique sparsis*; *Ab. balsamea*; *Pinus Strobus*, *P. fol. geminis*, *P. Larix*; *Pyrola uniflora*; *Juniperus communis*: *Acer pensylvanicum*; *Populus balsamea*: Le *Juglans oblonga* se trouve à Quebec mais cesse ici, ainsi que *Abies canadensis*; *Platanus occidental.* cesse au lac Champlain &c. &c.

Depuis la Baye S^t Paul, les Eboulements et la Malbaye les Montagnes sont formées de terre argilleux sables et Pierres roulées. Le Cap. Tourmente est formé de roches de Quartz. Sur les rochers un peu avant d'entrer dans la Baye, se trouve un arbuste rampant, *Empetrum nigrum*, f. touj. vertes, petites, ovales, reflechies, glauques par dessous (ce glauque ne paroît que comme une ligne la f. étant pl. étroite que celle du Romarin) Cal a 3 f. (ou 3. partitus) corolla à 3 petal (ou 3 partita), Etam. 3, dont les filets très longs, Germe superieur, styl. o, Stig. simple, Baye noire, aqueuse, semences 9.

Le 3 Aoust séjourné a la Malbaye.

Le 4 parti et couché à l'embouchure de la riv. Seganey.

Le Dimanche 5 arrivé le matin à 4 h. à Tadoussack: herborisé; *Juniperus commu.* *Junip. sabina*? 46 lieues de Quebec.

Le 6 Therm. de Fareinhit matin 51 $\frac{1}{2}$ ^{d.}, Vent d'E. N. E. Midy 70 D.

* *Vaccinium oxycoccus*, L.—C. S. S.

† *Mertensia maritima*, Don.—C. S. S.

J'ay engagé trois Sauvages pour remonter la Rivière Seganey. Depuis le Cap Tourmente jusqu'à Tadoussack, les Montagnes sont continuelles au Nord du fl. S^t Laurent et sont principalem^t de quartz pur q. q. fois mêlées de Shorl. Dans plusi. endroits la base des Rochers est de Pierre calcaire noire.

Le 7 Th. le matin 52 d. Parti dans un Canot avec trois Sauvages et le petit jeune homme Metis que j'avois engagé à Quebec po. interp. ayant demeuré trois ans av. les Sauvag. Par des montagnes continuées fait environ 10 li. Orages de Tonnerre et Pluye.

Le 8 Vent contraire, Ramé environ 4 lieues. Sur les Montagnes de Roches: arbust. baccifere, (*Empetrum nigrum*) cal. 3 phyll. cor. 3 parti. st. 3: *Arbutus foliis margine lanuginoso-membranacea*: *Arbut?* fol. apice glandulosis:* *Aralia nova hispida*. Couché aupres de la Cascade.

Le 9 Temps calme, passé devant un Rocher coupé perpendiculairement dit le Tableau, estimé la moitié du chemin de Tadoussack à Chicoutoumé Poste situé à l'endroit de la Rivière Seganey ou le flux de la Mer cesse de monter. Cette Riv. est reputée une des pl. grandes de celles qui se jettent dans le Fleuve S^t Laurent. Depuis l'embouchure ou le confluent on remonte l'espace de 21 lieues vers le N. Ouest, alors il se presente une grande Baye qui recoit probablement une aut. riv. et à l'entrée de la Baye on remonte cette riv. vers le Nord. La largeur de la rivi. jusq. la gr. Baye est généraleme^t d'env. 4 Miles tres resseriée par de hautes montagnes de roches coupées perpendiculairement. Il n'y a point de terre sur ces mont. et les Pins qui y croissent n'ont de substances que celles que les mousses leur fournissent. Elles sont generalement composées de Quartz mêlées de Schorl. en moindre partie quelq. fois assises sur une base calcaire. Mais les Rochers calcaires y sont à peine depuis le Cap. Tourmente. J'ay rencontré une fois une lieue avant d'arriver à la gr. Baye du Feldspath. Depuis la gr. Baye les Montagnes sont moins hautes et moins perpendiculaires. Campé une li. au dessus de la gr. Baye. Orage et Pluye.

Le 10 Vent du Nord très violent: sur les Mont. couvertes de Sphagnum, *Ledum palustre*, *Andromeda calyculata*, *Kalmia angustifolia*, *Vaccin. atoca*; *V. resinosa*; *Drosera rotundifolia*.

Le même jour campé à deux lieues de distance de Chicoutoumé.

Le onze reconnu sur les bords de la rivière en entrant dans le bois: *Swertia corniculata*, † le même jour arrivé à Chicoutoumé.

Le Dimanche 12, préparé à partir pour le lac S^{nt} Jean et les Lacs Mistassin. Préparé deux Canots: 300^{lb} de farine, 155^{lb} de Porc salé, deux Peaux de Loup marin po. Souliers, 100^{lb} de Biscuits, 50 de Pain, 10^{lb} de Sel, 5^{lb} de Poudre à tirer, 10^{lb} de Plomb, 3 Rouleaux d'Ecorce de Bouleau pour Tente, 3 Fusils, 5 aulnes d'Etoffe de Laine grossière, 3 paires de chaussons de laine, 2 paires de gants de laine. Outre ce qui avoit été pris po. provision à Tadoussack savoir: 26^{lb} de Porc salé, 50 de Pain haché,

* *Vaccinium Vitis-Idæa*, L.—C. 8. 8.

† *Halenia deflexa*, Griseb.—C. 8. 8.

couvertures, souliers, Pierres à fusil, Briquets &. Un grand filet, ham., six Couvertures.

Le 13 transporté deux Canots dans la rivière Chicoutoumé, ayant quitté ici celle de Sagny, six sauvages et sept sauvagesses furent employées à porter les provisions et le Bagage. Ce Portage est un des plus longs ayant une lieue et plus de distance de Sagny à la tête de la Cascade. Ce jour nous avons eu quatre autres Portages, la plupart de 200 toises à 500 toises environ po. passer par terre du bas d'une Cascade en haut. Souvent lorsque les Canots arrivent au dessous de ces Rapides ou Cascades, ils sont entraînés par la violence du courant des Eaux qui sont toujours en ces endroits resserrés par des roches énormes. Il faut alternativement ou ramer, ou forcer en piquant au fond, alors q. q. fois on se munit de perches et ainsi on lutte contre les Eaux. Malgré la legereté des Canots, les Sauvages emploient toutes leurs forces et ils sont très adroits à éviter les dangers d'être entraînés ou heurtés contre les roches ou enfin renversés, ce qui arrive q. quefois. Il y a rarement danger de perir, lorsque l'on sçait nager parce que alors en se laissant aller au courant des Eaux, l'on est porté immédiatement dans un endroit où l'eau est tranquille et souvent moins de deux pieds d'eau; alors il faut sauver ce que l'on peut, Canots, Bagage et Provisions. Ces voyages sont effrayants po. ceux qui n'y sont pas accoutumés et je conseillerois aux Petits Maitres de Londre ou à ceux de Paris s'il y en a encore de rester chez eux. Remarqué dans les rivières et sur les Rives. Potamogeton . . . Nymphaea lutea calix 3 phyllus: Petala 3, stam. numerosa & fol. cordatis. Nymphaea lutea Cal. . . . foliis et florib. minorib. Ranunculus reptans fol. linearis, caule repente; Chelone glabra florib. albis; Fraxinus &c &c &c.

Le 14 Aout Pluyé considérable toute la journée: herborisé et recueilli beaucoup d'especes de Mousses, Aster, Gramen, Helleborus trifolius, Mitella aphylla.

Le 15 navigué toute la journée par une pluye fine mais continuelle. Nous trouvames deux Portages situés à une lieue de distance l'un de l'autre et nous avons fini la journée en passant le Lac Senogamie* qui a 7 lieues de long et autres un a deux Miles de large. quelquefois il fut bordé par des montagnes de Roches. qq. fois par des Marecages. Sur les Montagnes reconnu Juniperus communis, Abies, Acer pensylv. Potentilla nivea &c. &c. Dans les parties basses et Marécages humides Myrica gale Andromeda polifolia, Comarum palustre, Prinos verticillatus, Gentiana pneumonanthe, † Mentha stam. corolla longiorib., Triglochin palustre, Alnus glauca stipulis lanceolatis, ‡ Vaccinium atoca. Dans le Lac, Nymphaea lutea major, Nymph. lutea minor, Sparganium natans, § Alisma subulata, ¶ Potamogeton . . . , Polygonum . . . , Lobelia simplex, ¶¶ Eriocaulon . . .

* c a d. Lac aux Arb. uva ursi.

† *G. linearis*, Froel.—C. S. S.

‡ *Betula pumila*, L.—C. S. S.

§ *S. minimum*, Bauhin.—C. S. S.

¶ *Alisma Plantago*, L. var. *Americanum*, Gray.—C. S. S.

¶¶ *L. Dortmanna*, L.—C. S. S.

Le 16 des le Matin nous avons rencontré deux Portages, l'un d'environ 50 toises et l'autre d'environ trois quart de lieue. Vers midy nous avons rencontré une rivière qui se perd dans le lac S^t Jean. Arrivé dans cette riv. nous faisons au moins 3 lieues par heure. Nous avons navigué ainsi environ dix lieues et nous avons campé sur le bord du Lac. En arrivant par l'Embouch. de cette riv., l'on aperçoit des Collines de Sable ou il ne croit que q. q. *Artemisia crithmoides*,* *Arundo arenaria*† . . . Ce Lac ressemble à une Mer par son étendue.

Le 17 le vent contraire nous empêcha d'entrer dans le Lac dès le matin, mais l'après midy, nous avons ramé pend^t quatre heures étants touj. à la distance d'un quart de lieue environ de la terre et souvent les Canots touchoient a fond.

Le 18, nous arrivames vers les 4 heures après midy au Poste établi par la Comp^e po. la traite des fourrures av. les Sauvages des Lac des Cygnes et le Lac Mistassini. Ce Poste est occupé par deux Comis. Canadiens. Mess. Panet freres.

Le 19 Dimanche une Brume épaisse nous empêcha de traverser le Lac po. entrer dans la riv. ditte Mistassin. Vers le midy il s'éleva un Vent considerable : herborisé aux environs du Lac; *Nymphaea lutea*, Calix 3-phyllus, Petala 3, etam. numerosa. *Nymphaea lutea minor*. Cal. 3-phyll. Petala 2, stam. numerosa &c. . . . *Andromeda polifolia*, *And. calycul.*, *Betula pumila*, *Arundo glumis 2-floris*, *Hippophae Canadens.* *Eriocaulon* . . .

Le 20 Tempete toute la journée.

Le 21 parti du milieu du Lac S^t Jean ou est établi le Magasin des Marchandises po. la traite av. les Sauvages. C'est le dernier Poste dans ces lieux sauvages. Il étoit neuf heures du Matin et nous entrames dans la Rivière ditte Mistassin à 2 heures de l'après midy. Nous avons voyagé en Canots dans cette Riv. jusqu' a huit heures du Soir. L'embouchure dans le lac est très peu profonde et pendant cinq à six lieues en remontant, on voit des bancs de sable mouvans qui ont plus d'une demie lieue de long. Les *Thuya* cessent au Lac, dit-on, et je n'en vis pas au long de cette riv. Je reconnus *Abies balsamea*, *Pinus abies*, *P. Larix*, *Populus balsamifera*, *Ledum palustre*.

Le 22 nous avons continué en remontant la rivière pendant une heure, et ensuite nous avons rencontré un Portage. Les Portages sont toujours causés par des Rapides ou Cascades au travers des Roches plus ou moins escarpées. A l'endroit de ces premiers rapides, la rivière diminue tout à coup, ayant eu jusqu' ici 3 à 4 Miles de largeur. Nous avons rencontré neuf Rapides et conséquemment nous avons eu neuf Portages à franchir sans quitter cette rivière ditte Mistassin quoiqu'elle ne sorte pas des Lacs Mistassins. Depuis le départ du Poste sur le Lac S^t Jean jusqu' aux Larges Rapides ou nous arrivames vers les 7 heures du soir, la distance est évaluée 18 lieues. Quoique l'on considere généralement les Rapides

* *Artemisia Canadensis*, Michx.—C. B. B.

† *Oulamagrotta*.—C. B. B.

ou Cascades perpendiculaires comme des Effets de la nature dignes de curiosité, l'on auroit de la peine à se former une idée de la Majestueuse perspective de celle-ci. Elle est naturellement comme un Amphitheatre dans l'enfoncement duquel on ne voit que les Arbres aussi bien que sur les cotés et elle s'élargit à sa base d'environ 250 toises sur une profondeur d'environ 250. L'on aperçoit des Rochers sans nombre au milieu des eaux brisées et réduites en brouillards comme des fumées épaisses. Le Lit de la rivière au bas de ces Cascades forme une pièce d'eau très étendue à la surface de laquelle on n'aperçoit pas de roches, mais qui est très agitée et produit en tout temps de grosses vagues à cause des roches sous l'eau et de la surface unie du sol resserré par les collines qui environnent cette base.

Les Eaux ayant heurtis sur les flancs de ces Collines de roches, elles reviennent de nouveau se mêler et se perdre à la base des rapides et y forment des bandes ou intervalles unies et tranquilles entre des eaux agitées par les diverses branches de la cascade générale. C'est alors que l'on est surpris de l'habileté des sauvages qui savent si bien prendre les alternatives, soit po. ramer à force de bras, soit po. s'arreter tout à coup. Quelque fois nous nous trouvés sur une bande ou intervalle tranquille tandis que les deux cotés sont agités de manière à envoyer des flocons d'écume dans le Canot. Il fallut aborder entre l'un des bras de la Cascade pour faire faire le Portage et poser le Bagage et les Provisions sur les Roches qui étoient au dessus de la surface des eaux. Le Danger est que les Roches sous l'eau sont couvertes ordinairement d'une espece de Byssus ou Mousse aquatique visqueuse qu'empêche de poser le pied ferme. Mon guide ayant voulu sauter d'une Roche sur une autre qui n'étoit qu'à un pouce sous l'eau, tomba avec sa charge qui étoit un paquet de 50 liv. de farine et le Sac qui contenoit ses hardes. Nous avons campé pres des Larges Rapides.*

Le 22 Aoust sur la Riv. Mistassin, *Alnus glauca*, *Myrica gale*, *Gentiana pneumonanthe*, *Potentilla nivea*, *Linna borealis*, *Epigæa rep.*, *Gaultheria*, *Ledum palustre*, *Kalmia glauca*, *Kalmia angustifol.* *Vaccinium corymbosum minus*, *V. atoca*, *V. fructu albo*, *Trillium capsulâ violaceâ angulatâ*, *Trill. capsulâ rubra ovata*, *Nartheicum . . .*, *Cerasus racemosa petiol. glandulosis*, *Ceras. corymbos. petiol. glandulosis*, *Cerasus fructu nigro petiol. eglandul. ditte Cerise de Sable*, *Cornus Canadensis*, *Corn. stolonib. rubris (Osier rouge)*; *Cornus ramis punctatis*, *Convallaria? baccis azureis*, *Conv. 3-folia*, *Conv. 2-folia*, *Conv. alt. sp.*, *Lonicera camæcerasus fol. tomentos.*, *Lon. diervilla*, *Lycopod. fructificationis paniculatis*, *And. calyculata*, *Pinus Larix*, *P. balsamea*, *P. abies alba*, *P. abies nigra*, *P. Strobis*, *P. fol. geminis fructu ovato loevi*; *P. fol. geminis breviorib.*, *Salix sericea*, *Salix stipulis foliaceis*, *Arundo glumis unifloris*, *Arundo . . .*, *Poa glumis 4-floris*, *Ribes cynosbat.*, *Fraxinus foliolis tomen-*

* Attached to the record of the 22d inst. is the following memorandum in Journal.—
C. S. S.

tos. serratis, *Betula alba* seu *papyrifera*, *Ulmus* . . . Orme blanc, *Rubus arcticus*, *R. occidentalis*, *Vib. Opulus petiol. gland.*, *Vib. nud.*, *Taxus*, *Spiraea salicifolia*, *Pteris*, *Oenothera*. *Thalictrum dioicum*, *Actaea spicata alba*, *Epilobium staminib. declinatis*, *Epil. petalis 2-fidis*, *Aster*.

Le 23 nous avons eu de la pluie qui avoit commencé des 2 heures du Matin et qui a continué jusqu' apres midy, nous avons resté campé toute la journée.

Le 24 nous avons rencontré deux Rapides ou Cascades et nous avons eu consequemment deux Portages; notre journée peut être évaluée à 8 lieues; Remarqué des Melezes d'une belle grandeur quoique tous les aut. sortes d'arbres diminuent de grandeur dans ces parages.

Le 25 nous avons été obligé d'aller avec des Perches po. luter contre les Courans de la Rivière. Cela étoit d'autant plus penible que le Vent du Nord souffloit très fort et nous avons fait environ 7 à 8 lieues.

Le Dimanche 26 le vent fut moins violent, nous avons été obligé de faire aller les Canots avec les perches seulement, depuis 7 heures du Matin jusque vers onze heures. Nous avons rencontré une Cabane de Sauvages et nous y avons diné avec de la Viande de Castor bouillie, des Bluets. (*Vaccinium corymbosum*) bouillies en consistance de Confitures et de ces mêmes Bluets frais. Les Montagnes qui ont été brulées en plusieurs endroits au nord de Quebec, sont couvertes de cet arbuste et l'on peut s'y rassasier au moins d'une heure et même d'un quart d'heure. Ce fruit est très agréable et la grande quantité n'incommode jamais. Notre Marche fut d'environ six à 7 lieues.

Le 27 nous avons trouvé la Rivière extremement diminuée de largeur, mais les courants très rapides étant resserrés par des Montagnes de Rochers tres escarpés; retrouvé le *Vaccin. foliis apice glandulosis c. a. d. Vitis Idæa*. Notre course peut être évaluée à 8 lieues.

Le 28 les Sauvages ont continué de piquer avec les Perches. po. forcer les courans tres rapides et vers deux h. après Midy nous arrivames au Portage Monte à peine. Nous avons été depuis 3 heures jusqu' à 7 h. du soir pour grimper cette Montagne et pour arriver dans une autre petite Rivière située de l'autre coté. J'évalue à 250 ou 300 toises perpendiculaires environ la hauteur de cette montagne et la Riv. située de l'autre coté n'est pas de 40 à 50 toises plus bas que le Sommet de cette Montagne Monte à peine. Les Sauvages me dirent que cette Riv. n'a pas de nom. Les Plantes remarquées principalement sur les Marais du haut de Monte à peine, sont. *Ledum palust.* *Kalmia angustifolia*, *Vaccinium corymbos. minus*, *Vaccin. niveum*, * *Kalmia glauca*, *Betula* . . . , *And. calyculata*.

Le 29 herborisé dès le matin sur les bords de la Petite Rivière : *Lycopo-*

* *Cl. togenes hispida*, Torr & Gray.—C. 8. 8.

dium inundatum, Lycop. . . . , Lycop. . . . , *Andromeda rosmarinifolia*,* *And. calycul.* *Kalmia glauca*, *Ledum palustre*.

Nous avons eu quatre portages à passer dans l'intervalle desquels nous avons voyagé sur deux Rivières qui n'avoient pas plus de 18 pieds de large. La profondeur étoit suffisante pour les Canots, mais plusieurs fois il fallut alléger les Canots pour les soulever au dessus des Dignes de Castor dont les Cabanes étoient sur la rive. Ces Cabanes sont toujours situées sur le bord des petites rivières ; elles sont baties de bois et de terre en forme d'un monticule de 3 à 4 pi. de haut sur une base de six pi. de large. Il y a une entrée sur terre et une sortie sous l'eau po. aller pendant les gelées des hyvers manger les écorces des bois qu'ils amassent dans l'eau ; ils coupent des pieces de la grosseur de la cuisse. Les Dignes sont pour arrêter et elever les eaux qui gellent d'autant moins qu'elles sont plus profondes. Toutefois les hyvers sont si longs et si severes que l'on a vu des trous dans la glace de deux pieds de profondeur. L'on ne peut (pourroit) se persuader la force, l'industrie, l'adresse et la patience avec les quels ces animaux travaillent po. vivre et se préserver des rigueurs des hyvers. Lorsqu'ils abattent un arbre, ils le font tomber à coup sur du coté qui leur convient po. exécuter leur enterprise, et s'il y a des paresseux, ils les chassent de la société et ceux ci vivent miserables et solitaires. Nous arrivames au Lac des Cygnes vers trois heures apres midy. Il est tres large, environné de terres basses, couvertes d'arbres tres petits, rabougris. Cette contrée porte l'aspect le plus affreux de la sterilité du sol jointe à la rigueur et à la longueur des froids. Les arbres sont des bouleaux. *Pinus fol. geminis*, *P. abies nigra*, *Ledum palustre*, *Kalmia glauca*, *Kalm. angustif.* *Andr. calyculata* et *Andr. rosmarinifolia*. En entrant, dans le lac des Cygnes j'aperçus un nouv. *Vaccinium*, † à tiges droites d'un pied et demi de haut, assez bien garni de branches, fruits solitaires, d'un gout plus acide que ceux que j'aye goûté en Ameriq. jusqu' à présent, mais cet acide est tres agreable, outre le port naturel à tous les *Vaccin.* je puis la considerer po. etre de ce genre de ceux à 8 étamines par les divisions du cal. superieur au fruit. La forme est celle d'une pomette plutot longue que ronde, mais de la grosseur seulement d'un pois. Ce fruit est bleuatre et les f. sont glauques. *Vaccinium uliginoso* affine.

Le Lac des Cygnes est intéressant par l'aspect de ses alentours, dont les terres quoique generalem^t basses sont assés bien entrecoupées de Collines de differentes formes. La multitude d'angles saillans et des angles rentrants, tantot rapprochent les deux rives opposées et tantot les eloignent de plus de deux lieues de l'une a l'autre quelquefois tres profo. q. q. fois il n'y a pas d'eau po. la Canot. Enfin je reconnus la *Potentilla fruticosa* sur plusieurs endroits du rivage et presque submergé en plusi. endroits ainsi que les *And. rosmarinifol.* et les *Andr. calyculata*. Le Sauvage qui conduisoit mon Canot, vit dans un endroit peu profond une tête de Castor très bien décharnée et tous les os de la tête et de la Machoire bien entiers.

* *A. polifolia*, L.—C. S. S.

† *V. uliginosum*, L.—C. S. S.

Il m'en fit present mais elle fut perdue de nouveau dans l'accident qui nous arriva en sortant du Lac po. remonter un Rapide au travers des roches. L'on avoit resolu de ne décharger les Canots qu'en partie et en sortant le Sauvage glissa sur une roche couverte de lichen gluant. Comme il avoit encore une jambe dans le Canot, il le fit pencher et dans l'instant, il se trouva à moitié plein d'eau. Tous mes Papiers, Plantes et autres parties de mon Bagage furent mouillés et toute la nuit fut employée à secher et à reparer en partie cet accident. Le 30 continué des le matin à secher mes herbiers, mes Collections de graines &c. Mes herbiers, enveloppés dans des Sacs de Peaux de Loups marins avoient peu soufferts en apparence et l'eau n'avoit penetré dans plusi. parties qu' à un pouce avant.

Le 30, nous avons navigué dans trois Lacs environnés de Montagnes peu élevées et qui se communiquent par des issues entre ces Collines. Le Sol dans toute cette Contrée est entrecoupé de Montagnes et de Collines dont les bas fonds ou vallées sont remplis d'eaux et forment ces Multitudes de Lacs dont la plupart n'ont pas de noms même par les Sauvages qui chassent frequemment dans cette Contrée. Des Intervalles considérables sont de Sphagnum palustre. L'on y enfonce jusqu' aux genoux et même par les plus beaux temps de secheresse, l'on y est toujours imbibé d'eau jusqu' aux genoux. Nous avons fait trois portages et nous avons fait env. 3 à 4 lieues à cause de la difficulté à traverser ces désagréables marécages.

Ces marécages ici abondent en *Kalmia glauca* et *Andromeda rosmarinifolia*, *Sarracenia purpurea* et *Vaccin. Atoca*. Dans les parties moins humides sont les *Andr. calyculata*, *Ledum palustre*, *Kalmia angustifolia*, *Epigea repens*, *Pinus abies rubra*, *Pin. fol. geminis breviorib.* Le *Pinus balsamifera* cessa au Lac des Cygnes, je n'en vis aujourd'hui que trois en forme de buisson et toute la Végétation porte ici l'empreinte de Pigmées décrépits, à cause de la stérilité du sol et de la rigueur du froid. Je vis aussi un nouveau *Vaccinium* * à fruits solitaires dans l'aisselle des feuil. fruit bleuatre, cal à 5 divisions, peu ligneux au lieu que celui du jo. precedent forme parfaitement l'arbriss ligneux bien formé. *Avena paniculata calycib. unifloris* est le seul gramen que j'ay vu aujourd'hui.

Le 31 Aoust, nous avons navigué pendant une heure et nous avons rencontré un Portage. Le froid étoit excessif et le temps couvert depuis 2 jo. et la pluye étoit comme de la neige fondue. Arrêté pour déjeuner, le froid nous étoit l'appetit et les Sauvages trembloient de froid, étant tous traversés d'eau tant de la pluye, que des Arbriss. mouillés au travers des quels on avoit passé et que des marécages de *Sphagnum* que l'on est obligé de traverser ou l'on enfonce jusqu' aux genoux en plusi. endroits. Quoiq. je fusse mieux couvert d'habilleméns, j'avois aussi tant de peine à résister au froid, que je fis faire du feu et vers dix heures nous nous sommes mis de nouveau en route. Nous avons passé trois Lacs et une

* Probably his *V. caspitosum*.—C. S. B.

riv. d'eau courante: *Narthecium calyculatum*,* *Epilobium fol. linearib.*, *Kalmia glauca*, *And. rosmarinifolia* &c. &c.

Le samedi 1^{er} Septembre, la pluye nous empecha de voyager et un des Sauvages fut malade. La cause me parut être la transpiration arretée. Il avoit été mouillé de la pluye le jour precedent et il avoit dormi dans sa Couverture qui étoit imbibée d'eau. L'après midy le temps fut moins obscur et nous avons navigué nonobstant la pluye. Toute la nuit, il y eut Pluye, Tonnerre et Eclairs. Nous avons fait env. six lieues et nous avons eu un lac et des rivières tres étroites ou il n'y avoit q. la largeur d'un Canot.

Le Dimanche 2 le temps fut très obscur des le matin et il se resolut en Neige fondue. Le froid fut moins rude, mais nous avons eu un portage de trois quarts d'une lieue au travers d'une Savanne de Sphagnum ou l'on enfonçoit jusqu' à la moitié des jambes et malgré les ondées de grêle qui continuerent toute la journée nous continuames à voyager, car les Sauvages aussi bien que moi désiroient arriver le plus tôt possible à Mistassin de peur que les Neiges et les froids ne devinsent plus considerables. Nous avons eu trois Lacs à traverser et nous avons fait environ dix lieues.

Le 3 la gelée fut à glace d'environ une ligne d'épaisseur. Des Minuit je vis la gelée blanche sur les arbrisseaux et les herbes qui environnent le foyer ou nous étions campés. Le [temps] parut bien disposé au moins po. la journée, mais vers 7 heures l'air devint nuageux et nous avons eu de la Pluye et alternativement de la Grêle et de la Neige et des Intervalles d'un beau soleil. Nous avons vu un Caribo (Renne) dans une Prairie, mais les Sauvages ayant la vent sur . . . † ne pouvoient le joindre. A onze heures nous entrames dans une grande rivière qui coule vers le Nord. Ayant les courants favorables, no. avons fait 16-18 lieues. Le sol me parut meilleur.

Le 4 Septemb. nous avons fait trois fois Portage à cause des courants très rapides dans les rochers. A 10^h 1-4 entré dans le Lac Mistassin. Aux environs du Lac, *Bartsia pallida*, *Gentiana?*, *Narthecium ossifragum calyculatum*, *Lycopod.?* &c. &c. Navigué dans le Lac environ 10-12 lieues, campé sur la rive gauche N. Ouest à 6 lieues de distance du Lac.

Le 5 fait environ 8 à 10 lieues et diné sur la rive des Goelands à 16 lieues de distance du Lac. Tué une Oie à collier. Nous avons pris 5 poissons qui avoient un pied 1-2 à 2 pi. de long. Le soir campé.

Abies nigra, *Larix*, *Betula pumila*, *alba*; *Sorbus aucuparia*; *Myrica gale*, *Cornus Canad.* (*Cornus Osier rouge*) *Ribes*; *Ribes*; *Ribes*; *Pinguicula alpina?* *Vaccini. niveum* 8 etam: *V. atoca*: *Vaccin. uliginosum?* *Epigea*; *Avena nuda*; *Arundo glumis 2-floris*; *Andromeda rosmarinifol*; *Kalmia angustifolia*; *K. glauca*; *Sarracenia purpurea*; *Vaccinium Vitis idaea*; *Pteris aquilina*; *Osmunda regalis*; *Hieractium paludosum?*; *Linnæa borealis*; *Vaccin. corymbosum minus*. 22 lieues

* *Toxellidia glutinosa*, Willd.—C. S. S.

† Illegible.—C. S. S.

en totalité. Campé pres la rivière Atchouke. (Riv. des Loup-marins).*

Le 6 revenu à Mistassin 26 lieues. Collines des environs du Lac Mistassin : sol est un sable pur à la surface et pl. bas sable argilleux. Les Pierres et les Roches sont de Quartz impur, mêlé d'argille q. q. fois de terre végétale. Les Pierres du rivage usées par l'agitation des flots présentent des formes extraordinaires parceq. les couches d'argille ou d'autres substances moins dures sont plus usées. Il y a aussi des Pierres de Quartz micacés et de Schorl, très peu de Quartz pur. Je n'ay point vu de Pierres calcaires. Nulle apparence de Pierres volcanisées. Le Sol est peu élevé aux alentours. Les Collines sont de grandes distances. La Décharge des Eaux de ce Lac est vers le Nord et le Nord Ouest par différentes Riv. qui vont à la Baye d'Hudson. L'on peut y aller en 4 jours, mais il faudroit 10 jo. po. revenir. Notre Course fut de 28 lieues tant les Sauvages avoient envie de revenir. Les Arbres du Bas Canada ne se trouvent point aux parties élevés du Canada, quoique ces arbres et Plantes soient dans la plus grande vigueur aux parties basses du Canada.

Le 7 nous sommes partis de Mistassin et nous avons courru environ dix sept à dix huit lieues à cause des courans des Rivières très rapides.

Le chef des Sauvages qui me conduisoient tua un Loutré qui traversoit à la nage une rivière et de temps en temps sortoit la tête hors de l'eau. Nous avons été en route depuis 6 heures du matin jusque env. 6 h. du soir, malgré le brouillard et le froid.

Le 8 Gelé à glace dans un Vase de fer blanc. Beau temps toute la journ. A 24 lieues environ de Mistassin auprès d'une Savanne, recueilli des echantill. d'un Juniperus communis, mais quoiqu' il y eut plus de 40 Plants dans ce lieu, je n'eus pas la satisfaction de le voir en fructification. Mon Sauvage tua un Rat musqué (Castor Zibaticus Linn.) Le soir il le mangea roti avec ses Camarades, mais il ne voulut pas manger du Loutré qu'il avoit tué le jour precedent. Nous avons fait environ 20 lieues au travers de plusieurs rapides avec le courant, au lieu qu'en montant nous avons été obligé de faire Portage.

Le Dimanche 9 Septembre, nous avons passé le Lac des Cygnes, nous sommes venu coucher sur la Montagne Monte à peine. Notre course fut évaluée à 20 lieues. Les *Andromeda calyculata*, *Kalmia angustifolia*, *Ledum palustre*, couvrent la surface du sol sur les Collines et les Montagnes dont les arbres ont été brûlés. Les parties qui n'ont été brûlées

* This Camp was the most Northern point reached by Michaux. No reason for his return southward is given in the Journal. The explanation, however, is found in the following passage in Deleuze's Historical Notice of Michaux :

" Michaux entre le 3 Août dans une petite rivière qui conduisoit au lac Mistassin ; il faisoit alors un froid excessif ; il tombolt de la neige : cependant il continua sa route et arriva le 4 Septembre dans le lac Mistassin : apres en avoir reconnu les bords, il descendit une rivière qui communique à la baie d'Hudson ; il la suivit pendant deux jours, et il n'étoit plus qu'à une petite distance de cette baie lorsque les sauvages, croyant dangereux de s'avancer plus au nord dans cette saison, voulurent absolument revenir ; ils l'assurèrent que si les neiges continuoient, le retour deviendroit impossible."—*Annales du Muséum*, III. 212.—C. 8. B.

que depuis deux ans au plus sont couvertes de *Vaccin. corymbos. minus*. Les *Pinus abies nigra*, *P. Larix* et *Pinus fol. geminis breviorib.* formant la Masse principale des bois. Il y a des Intervalles considerables de Marecages couverts de *Sphagnum* dans les quelles on enfonce jusqu'à la moitié des jambes. Il n'y croit que des *Andr. rosmarinifolia*, *Kalmia glauca* et *Betula pumila*, *Vaccinium atoca*, *Sarracenia purpurea*, Ces marecages ne sont jamais à sec et les plus aquatq. ne produisent que des *Andr. rosmarinifolia* et des *Kalmia glauca*. Notre course fut d'environ 30 lieues.

Le—Septembre j'ay fait recueillir de la mousse pour emballer des Plantes recueillies autour du Lac. Dès le Matin je fus herboriser et en revenant, je vis quatre gros Poissons pris dans les filets que les Sauvages avoient tendu la veille. Apres déjeuné, je continuai mes herborisations autour de la Presqu' Isle ou nous étions campé et je visitay plusieurs situations sçav. Ouest, Nord et Est, Est-Sud-Est, Ouest-Nord-Ouest : je reconnus *Pinus abies nigra*, *P. Larix*, *P. fol. geminis*, *Betula alba*, *B. pumila*, *Sorbus aucuparia americana*, *Mespilus Canadensis arborea*, *Rubus occidentalis* ; *Rub. arcticus* ; *Potentilla fruticosa* ; *Myrica gale*.*

Vu petit Pie ; dessus du corps noir mêlé de taches blanches et plus gris sur les cotés et les extremités des ailes, le ventre blanchatre, quelques plumes de la queue blanche à l'extremité : Deux oiseaux du genre de *Pies* sommet de la tête noir, vers le devant blanche, dessus du corps et des ailes brun-cendre. Poitrine et Gorge blanchatre ainsi que la partie dessous les yeux, yeux noirs, Oreilles larges &c &c . . . extremité de la queue bordé de blanc . . .

Le sol à Mistassin est un sable pur à la surface et plus bas sable argilleux. Les Pierres et les Roches sont de Quartz impur mêlé d'argille plus fréquemment de terre végétale. Les Pierres du rivage usées par l'agitation continuelle des eaux, présentent des formes extraordinaires parceque les couches d'argille ou d'autres substances moins dures sont plus usées de sorte qu'il y a des intervalles plus usées et d'autres qui le sont moins, au nombre de 6-8-10 dans une longueur de deux pieds. Il y a aussi des Pierres de Quartz micacées et de Schorl, très peu de Quartz pur. Je n'ay point vu de Pierres calcaires, ni aucune apparence de Pierres volcani-ées. Le sol est peu élevé aux alentours. Il n'y a que des collines à de grandes distances. La decharge des Eaux de ce Lac est vers le Nord et le Nord-Ouest par différentes riv. qui vont à la Baye d'Hudson. Les Sauvages disent que l'on y peut aller en quatre jours, mais il faut dix jours po. revenir à cause des courants trop rapides.

Le † nous avons pris cinq Poissons qui avoient depuis un pied et demi à deux pi. de long. Les Quadrupedes que j'ay eu occasin de voir depuis le lac St Jean jusqu'au Lac Mistassin sont ; Renne dit Caribou par les Canadiens, Attakko par les Sauvages ; Castor Amish-Ko par les Sauvages ; Loutre Netchako ; Martes, Marmottes par les Canadiens Siffleux ; Il y a des Linx, Renards, Ours &c. et un animal tres rusé que les Canadiens

* (Cy-dessus il y a erreur de date.)

† This date is blotted out.—C. S. S.

nomment Carcajou et les sauv. Kouikouatchou qui ne court pas vite, mais sçait prévoir le passage du Renne, grimpé sur un arbre et se jette dessus. Les Sauvages me dirent que plus souvent il marche assés doucement po. surprendre le Renne et lorsqu'il se jette dessus, il n'y a aucun moyen po. lui de s'en débarrasser, à moins que le Renne ne trouve une Rivière, alors le Carcajou lache sa proie.

Je me propose de reprendre ici les Arbres et les Plantes que je remarquay depuis cette Contrée la plus septentrionale ou j'ay penetré en Amerique et j'auray soin de remarquer les Parages ou chaq. espèce differente comence à exister. Collines qui environnent le lac Mistassin ;

Pinus abies nigra, *P. Larix*, *P. balsamifera*, *P. foliis germinis* ; *Betula pumila*, *B. alba* ; *Sorbus aucuparia americana* ; *Cerasus corymbosus* ; *Juniperus Sabina* ? ; *Myrica gale* ; *Cornus Canad.*, *Cornus* (Osier rouge des Canadiens) . . . ; *Rubus occidentalis*, *Rub. arcticus*, *Ribes* . . . , *Ribes* . . . , *Ribes* . . . ; *Potentilla fruticosa* ; *Vaccinium corymbosum* 10 et. ; *V. (pumila)* 10 etam., *Vaccin. riparium* 8 etam. *Vaccin. Atoca* 8 et. *Vaccin. niveum* 8 etam., *Andromeda calyculata*, *And. rosmarinifolia* ; *Kalmia angustifolia*, *Kalm. glauca* ; *Linnea borealis* ; *Sarracenia purpurea* ; *Bartsia pallida* ; *Euphrasia odontites* ; *Rhinanthus cristagalli* ; *Pinguicula* . . . *Cacalia hastata*, *Cacalia incana* ; *Vaccin. vitis idaea* 8 etam. : *Hieracium paludosum* ; *Pteris aquilina* ; *Osmunda regalis*, *Osmunda filiculifolia*.

Les *Pinus Strobus* ; *Thuya occidentalis* ; *Populus balsamifera* ; *Betula nigra* ; *Gaultheria procumbens* ; *Rubus odoratus* ; *Adiantum pedatum* ne se trouvent point aux parties élevées du Canada quoique.

Le 10 nous avons eu sur le sommet de la Montagne une Gelée blanche très forte et dans les ruisseaux, les branches des arbrisseaux sur lesquels l'eau passoit étoient chargés de glaçons. En arriv^t de l'autre coté sur la partie meridionale, la gelée avoit fait son effet, mais les *Convallaria* et autres plantes tendres étoient peu endommagées. Le *Lonicera Diervilla* commence ici et se contin. en abondance jusque vers Albany. *Achillea millefolium* commence ici et se trouve en Canada et même sur le Lac Champlain. Les sauvages et moi nous avons tué neuf Poules de bois nommées Perdrix (*Tetrao lagopus*) par les Canadiens. Ces oiseaux sont en compagnie et volent à peu de distance sur les arbres ou ils se laissent tuer jusqu' au volier. Leur nourriture est des graines de *Vaccin.*, de *Carex* et de bourgeons de *Melezes* comme je l'ay vérifié. Nous avons rencontré deux familles de Sauvages, l'une me fit present d'une gateau de Bluets (*Vaccinium corymb.*) cuit en resiné et seché ensuite. Je lui donnay en Echange de la farine et du Porc salé de mes Provisions et il me donna un second gateau. Nous avons fait environ 22 lieues ayant eu un Vent contraire très fort qui empechoit de tenir le plein courant des rivières. Le Soir un des Sauvages que nous avons rencontré, apporta un Ours qu'il venoit de prendre à un de ses Pleges. Je lui fis donner à souper dans l'espérance d'avoir de la viande fraîche de sa Chasse.

Le onze des le point du jour je vis la femme du Chasseur qui se mit à dépouiller l'Ours et je fis mettre la Chaudiere au feu que nous avions particulièrement à peu de distance. En effet il m'apporta la Tête et un très gros morceau de filet. Il y avoit bien 8 à 9 liv. de viande, c. a. d. environ 6 livres sans les os. Je lui fis donner deux Boiss. de farine et un morceau de Porc salé. Nous déjeunames de bon appetit et il ne resta que les os. L'Interprete q. j'avois, mangeoit à peu pres autant qu'un Sauvage. Moi même je mangeois trois fois plus depuis que j'étois au Canade q. je ne pouvois faire pendant que je residois en Caroline. Malgré les fatigues de ce voyage et les souffrances occasionnées par les Maringoins (cousins) par les mousketiques (très petites abeill. dont l'air est rempli) et par les Brulots aut. petite mouche qu'on ne peut distinguer qu'un Microscope, ma santé s'étoit retablie entierement. Vers neuf heures nous nous sommes embarqués ; nous avons descendu plusi. rapides sans faire Portage et après avoir fait environ 15 li. nous sommes arrivés aux Grands Rapides. Ici commence la Potentilla tridentata. Trois lieues au dessous des Larges Rapides, l'on voit des Frênes et des Ormes. Il est à remarquer que l'on n'en voit aucuns depuis les Larges Rapides jusqu' a Mistassin. Quatre lieues au dessous des Grands Rapides je vis le 1^{er} Pinus Strobus ; car je n'avois pas rencontré un seul depuis cet endroit jusqu' a Mistassin tant en montant qu'en descendant. Le Pays est montagneux depuis le Lac des Cygnes jusqu' aux Larges Rapides. Et ensuite jusqu' au Lac S^t Jean les terres sont basses et l'on n'aperçoit point de Montagnes.

Il est très évident q. le le Pays situé entre le Lac des Cygnes et le Lac Mistassin est le plus élevé, car le Lac Mistassin se décharge dans la Baye d'Hudson par la riv. des Nids de Goelands qui coule au N. Ouest et le Lac des Cygnes se décharge dans le Fleuve S^t Laurent par la riv. Mistassin, par le Lac S^t Jean, par la riv. Chicoutoumé et enfin par la riv. Segonay jusqu' au Tadoussack ou elle rencontre le fl. S^t Laurent. C'est avec difficulté que je nomme Rivière Mistassin la riv. que coule depuis le Lac des Cygnes jusqu' au Lac S^t Jean. J'ay fait cette observation aux Canadiens qui vont traiter dans ce Pays avec Sauvages. Ils m'ont dit que l'on croyoit autrefois que l'on pouvoit remonter cette rivière jusqu' au lac Mistassin et que c'est pour cette raison qu'elle a été ainsi nommé par les Missionnaires Jesuites.

Nous avons fait environ 14 lieues et nous avons campé aupres des premiers Pins de Weimouth (Pinus Strobus) qui se recourent en descendant de Mistassin.

Le 12 Septembre Grand vent et Pluye froide. J'ay remarqué en descendant que le Pays bas est uni ; l'on ne voit point de Montagnes à droite et à gauche de la rivière qui a entre une lieu en demie et 2 lieues de large, environ 15 li. avant son embouchure dans le Lac entrecoupée de larges bancs de sable et est peu profonde. Nous sommes arrivé vers 7 heures du soir au Poste du lac S^t Jean et nous avons fait environ 15 lieues.

Le 13 j'ay herborisé aux environs du Lac. J'ay fait recueillir diverses

espèces de graines. J'ay dépouillé plusi. espèces d'oiseaux et des Quadrupedes et je me suis préparé à continuer mon voyage. *Circea Canadensis*, *Mitella aphylla*. Vu le gros Corbeau (*Corvus corax*)

Le 14 Grand vent du Sud Ouest ; il fut impossible d'aller au large avec les Canots et toute la journée j'ay employé les Sauvages à recueillir des Graines.

Le Poste établi sur le lac S^t Jean po. la traite av. les Sauvages est situé au N. Ouest du Lac. Le sol y est generalement sablonneux, mais il y a des étendues considérables de bancs de Pierre calcaire. Les Pierres calcaires sont disposées par couches applaties et sont qq. fois de Schitz. On y voit des Petrifications de Coquillages marins et de Cornes d'Ammon qui ne sont que très peu en forme de cornes, mais presqu' égales d l'extrémité à la base et de la gross. d'un doigt. Il y a aussi vers le Nord des Roches de Quartz. (Memento :

J'ay oublié de noter que depuis Monte à peine, les Montagnes sont generalement de Roches calcaires, mais il y a aussi des etendues considerables ou les Collines sont de pur sable et d'autres mêlées de sable et de Cailoux ou Pierres roulées, nommés par les Canadiens Pays d'éboulement.

Le 15 Septembre parti du Poste sur le lac S^t Jean. A la distance d'une lieue et $\frac{1}{2}$ il y a une petite Riv. qui tombe dans le Lac. (La riv. Chouamouchouan tombe dans la lac exactement à l'Ouest en couchant de Septentr. La riv. Mistassin tombe dans le lac à l'O-S-Ouest. Vu deux aut. riv. qui tombent dans le lac. Enfin nous arrivames le soir à la riv. . . . , qui devoit nous conduire à Chicoutoumé et nous avons campé auprès. Enfin en cotoyant le Lac depuis l'Est par le Sud jusqu' à l'Ouest, il y a cinq grandes rivi. qui se rendent au Lac. La grande décharge se fait par la riv. Sagney au N. Est. Je ne sçais pas s'il y en a d'autres.

Le Dimanche 16 quitté entierement le Lac et nous sommes venus camper à l'extremité meridionale du Lac Sinogomie. Ce Lac n'a pas plus d'une demie lieue dans sa plus gr. largeur. Sa longueur est de 7 lieues. A l'entrée de ce Lac par le Nord j'ay remarqué, *Acer rubrum*, *Medeola Virginica*, *Cypripedium calceolaria* flore rubro, mais cette derniere plante existe aussi sur les Collines qui avoisinent le Lac des Cygnes, ainsi elle ne doit pas etre considerée comme commençant en ce lieu. Les Montag. de roches qui entourent le Lac Sinogomie sont à Pic quoique d'une mediocre hauteur et les bois y sont forts et fournis de grands arbres comme dans un sol fertile.

Le Lundy 17, nous sommes arrivé à Chicoutoumé : Plantes remarquées de nouveau, *Polygonum aviculare*, *hydropiper*, *Lanium* . . . , *Lappa*

La distance du Lac S^t Jean à Chicoutoumé est évaluée à 40 lieues.

Le 18 parti de Chicoutoumé, le vent nous fut favorable et nous avions le reflux de la mer à notre avantage.

Le 19 nous sommes arrivés à Tadoussack.

Le 20 j'ay fait recueillir du Thé de Labrador* et j'ay recueilli d'autres sortes de graines.

Le 21.

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Le 27 Septembre parti de Tadoussack.

Le 28 arrivé à la Malbaye.

Le 29 herborisé et

Le Dimanche 30 reconnu *Salicornia* *Salsola* *Lappa*

. . . . , *Ranunculus* , *Trifolium* , *Lithospermum*

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Le 1^{er} Octobre parti sur un bateau po. Quebec.

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Le Mercredi 17 parti de Quebec et couché à la Pointe aux Trembles.

Le 18 Octobre passé la Pointe aux Trembles, la Rivière Jacques Quartier et couché à S^{te} Anne chez M^r

Le 19 Passé à Batiscan Trois Riv. et couché à Machicha : *Juglans hiccory*, *Celastrus scandens* aux Tr. Rivières, *Populus (fastigiatus?)*, aussi aux Trois Riv. ainsi que *Triosteum*, *Ulmus*, *Carpinus*, *Quercus alba*, *Pinus Canadensis*. . . . *Spiræa tomentosa* et *Sp. opulifolia*, *Adiantum pedatum*, *Fagus sylvatica Americana* aux Tr. Rivières mais plus certainement a Berthier. *Cephalanthus occidentalis* comm. à la riv. de l'Assomption. *Ledum palustre* se termine vers la Rivière l'Assomption ainsi que la *Kalmia glauca* que j'ay vu a Batiscan.

Le 20 couché près la Riv. l'Assomption.

Le Dimanche 21 arrivé à Montreal.

Le 22 Octobre aux environs de Montreal, *Cratægus coccinea*, *Cratægus lutea*, † *Cephalanthus occidentalis*, *Prinos verticillatus*.

Le 24 Diné chez M. . . . Henry.

Le 27 diné chez M^r Frobicher.

Le 28 diné chez M^r John Dease.

Le 30 diné chez M^r Selby.

Le 7 Novembre 1792 parti de Montreal et les brouillards furent si épais que les conducteurs perdirent le Chemin. Le Bateau echoua sur des Roches ou nous avons passé la nuit. Le Bateau faisoit de l'eau. Mes Livres et une partie de mon Bagage furent mouillés.

Le 8 passé à Longueil et arrivé à la Prairie.

Dejeuné chez M. La Croix Esq. le Lendemain.

Le 9 payé 2 Piast. po. Transporter mon Bagage à S^t Jean. L'on paye communément une Pi. $\frac{1}{2}$ po. avoir une Caleche de S^t Jean à la Prairie. La distance est 6 li.

De 10 Visité le colonel Gordon et diné avec les Officiers de la Garnison.

* *Ledum*—C. S. S.

† Probably the yellow fruited variety of *Cratægus punctata*, Jacq.—C. S. S.

Le Dimanche 11 Dejeuné chez le colonel Gordon. Toute la journ. occupé à faire secher mes Livres et mes Effets.

Le 12 Diné avec le colonel Gordon.

Le 13 parti et couché vis-a-vis de l'Isle aux Noix 15 Miles.

Le 14 nous avons fait 10 Miles.

Le 15 après 5 Miles de chemin passé devant la Ligne qui separe le Canada des Etats-Unis : Cette ligne est située à 9 Miles au Sud l'Isle aux Noix. Passé ensuite devant la Pointe au Fer quoique sur le territoire des Etats-Unis et occupé par le 26^e Regiment de Soldats Anglais dont est Commandant le Capt. Hope.

La Pointe au Fer est à 15 M. de l'Isle aux Noix et nous sommes venus coucher à Cumberland Head 26 Mill. de la Pointe au Fer. et 56 Miles de S^t John.

Le 16 Une Tempête accompagnée de neige nous obligea de séjourner.

Le 17 Nous sommes partis de Cumberland Head et nous avons relaché sur le territoire de l'Etat de Vermont au lieu dit Shelburne : Platanus occid., Ceanothus Americanus. Enfin nous avons couché sur le territoire de Vermont vis-a-vis Split Roc : 39 Miles de Cumberland Head.

Le Dimanche 18 Novembre, le Vent du Sud très violent et contraire nous obligea de séjourner : Ceanothus Americ., Hippophae Canadensis, Acorus.

Le 19 nous avons dejeuné à Bason Harbour 6 Miles : Passé par Crown point 12 Miles et nous sommes venu coucher à Ticonderoga : scæv. 35 Miles de Split Roc ou Rocher fendu : Pinus bifolia, Hippophae, Juniperus communis.

Le 20 nous avons relaché à deux endroits differens du territoire de Vermont et nous sommes venus coucher à Skenborough dit Whitehall.

Le 21 et 22 séjourné à Skenborough po. secher mes Graines endomagés dans le Boat sur le lac Champlain.

Distance de Montreal à Skenborough extremité meridionale du lac Champlain

De Montreal à la Prairie	6 Mill.
De la Prairie à S ^t Jean	18
De S ^t Jean à l'Isle aux Noix	15
(De l'Isle aux Noix à la ligne de Demar- cation entre les Etats-Unis et le Canada la distance est de 9 miles)	
De l'Isle aux Noix a la Pointe au Fer	15
De la P. au Fer à Cumberland Head	24
De Cumberland Head à Split Roc	39
De Split Roc à Bason Harbour	6
De Bason Harbour à Crown Point	12
De Crown Point à Ticonderoga	15
De Ticondaroga à Skensborough mainten- ant nommé Whitehall	28
	—
Total de Montreal à Skensborough	178

Le 23 Novembre 1792 parti de Skenboroug (dit Whitehall) et venu déjeuner au Fort Ann 12 Miles. Plantes remarquées : *Pinus Strobus*, *Pin. canadensis*, *Acer sacharinum*, *Alnus glauca*, *Liquidambar peregrinum*,* *Acorus*. . . . , &c &c Venu coucher au Fort Edward 24 miles de Skensborough. Entre Fort Ann et Fort Edward : *Laurus Benjoin*, *Liquidambar peregrinum*, *Pinus foliis ternis*, *Pinus Strobus*, *Pinus canadensis*, *Andromeda racemosa*, *Hamamelis Virginiana*.

Le 25 Neige abondante, séjourné au Fort Edward chez le Capt Baldwin.

Le Dimanche 25 parti et couché à Saratoga 20 Miles : Le *Fagus Castanea americana* commence vers Saratoga.

Le 26 continué la route sur la rive opposée de Saratoga. Dejeuné à Easton. *Cornus florida*, *Laurus Sassafras*, *Liriodendron tulip.* commencent aux environs d'Easton à 10 Miles de Saratoga : Couché à Albany 36 Miles de Saratoga.

Total la distance de Skensborough à Albany est de 80 Miles.

Le 27 embarqué sur un Sloop au Port d'Albany sur la riv. d'Hudson po. New-York.

Le 28 et 29 Vent contraire

Le 30 Vent de N. Ouest, relaché sur la rive de la Riv. Hudson opposée à Poughkeepsie, le vent ayant rompu la Voile. J'allay herboriser sur les collines et j'ay reconnu *Azalea viscosa*, *Kalmia latifolia* qui commence vers cet endroit, *Liriodendron tulipifera* ; *Juniperus Virginiana* commence ici et *Juniperus communis* se termine en ces parages ; *Thuya occidentalis* se termine ici quant aux situations basses, mais sur les montagnes il continue en plusi. endroits du New Jersey. *Nyssa aquatica* ou plutot *Nyssa montana foliis petiolis villosis* commence vers Albany. *Quercus* . . . Chêne chataignier commence vers Albany.

Remarqué aussi sur les rochers de la rive opposée à Poughkeepsie dix Miles au dessous : *Arbutus (acadiensis ?) fol. integerrimis* : *Liquidambar styraciflua* commence vers les hauteurs de Catskill.

Le Samedi 1^{er} Décembre 1792 passé devant Crown Point. †

Tariton est une petite Village situé à 32 Miles de New-York. Montag. sur la rive opposée avec un Lac.

Le Dimanche 2 arrivé à New-York.

De Montreal à Skensborough	178 M.
Dud Sk. à Albany	80
D'Alb. à New-York	164
Total	422

Le 6 parti de N. York.

Le 8 arrivé à Philad^{ie}.

Le 10 proposé à plusieurs membres de la Societé philosophique les avantages pour les Etats-Unis d'avoir des Informations Geographiques des

* *Comptonia asplenifolia*, Gært.—C. S. S.

† No doubt a slip for West Point.—C. S. S.

Pays de l'Ouest du Mississipi et demandé qu'ils ayent à endosser mes traites pour la somme de 3600^{lb.}, moyennant cette somme je suis disposé à voyager aux Sources du Missouri et même rechercher les rivières qui coulent vers l'Océan Pacifique.

Ma proposition ayant été acceptée, j'ay donné à M. Jefferson, secretaire d'Etat, les Conditions auxquels je suis disposé à entreprendre ce voyage. Par ces Conditions, je n'entends pas accepter les Cinq Mille Piastres montant de la Souscription formée par les Membres de la Société Philosophique mais seulement une Avance de 3600^{lb.} mentionnée cy devant, dont le remboursement sera fait sur les Appointemens qui me sont dus. J'offre de de communiquer toutes les Connoissances et Informations Geographiques à la Société Philosophiq. et je reserve à mon profit toutes les Connaissances en Histoire Naturelle que j'acquerray dans de voyage.

Le 20 Janvier 1793 j'ay communiqué à M^r Jefferson les conditions sur lesquelles je suis disposé à entreprendre le voyage à l'Ouest du Mississipi.

Le 29 Janvier j'ay fait un Envoy des Graines du Canada. Par le dit envoy dud. 29 Janvier j'ay adressé des Oiseaux, des Quadrupedes &° &° des Insectes et des Plantes.

Le 10 Fev. Envoy par la Roch des Pl. fraiches du Canada.

Le 18 Fevrier annoncé la traite de 1200^{lb.} en écrivant à mon fils par le Paquebot le Suffrein.

Le 29 Fevrier écrit au Dr. Afzelius par le Baron De Nolken à Lond.

Le 2 Mars écrit à mon fils.

Le 1^{er} Avril écrit de New-York à Louis Bosc et à mon fils : Envoyé Oiseaux, Ecureuils, Insectes, Graines, Echantill. de Plantes &c &c.

Le 24 Avril envoyé par le Hav. de Grace une Boite d'Insect. Echantill. du Panax &c.

Le 30 Avril communiqué à la société Philosophique les motifs sur lesquels je suis disposé à entreprendre le Voyage à l'Ouest du Mississipi.

(Le 10 May Envoyé à Bosc des Insectes mais l'Envoy n'est parti que le 9 Juin suivant.)

Le 29 May écrit à M^{de} Desaint.

Le 9 Juin envoyé des Insectes à Louis Bosc (ces deux envois ne font qu'un.)

Le . . . May arrivé à Philadelphie, Le Citoyen Genet Minist. Plenipotentaire de la République française.

Le 18 May communiqué au Citoyen Genet un Mémoire d'Observations sur les Colonies Françaises dans l'Ameriq Septen., sur la Louisiane, sur les Illinois et sur le Canada.

Le 22 May remis un Memoire abregé de mes voyages dans l'Ameriq. Septentrionale.

Le . . . Juin 1793 remis un Etat des sommes touchées et de mes Dépenses depuis mon départ de France pour l'Ameriq Septentrionale.

Le . . . consulté et conféré avec le Citoyen Genet sur ma mission au Kentucky.

Le 22. 23. 24. 25 et 26 Juin préparé au voyage du Kentucky.

Lettres de recommandation po. H. H. Brackenridge Esq. at Pittsburgh ; Po. Major Isaac Craig, du Major S^{re} Stagg. Po. Captain John Pratt Commanding of Troops on their march to the western Frontiers. Po. Brigad. Gen^l Geo. Rogers Clark. Po. Isaac Shelby Esq. Governor of the State of Kentucky, po. Alex^r D. Orr Esq. near Limestone, Dr. Adam Rankin, Danville : James Brown Esq. Lexington.

Le 1^{er} Juillet emballé mes effets.

Lett. de recommandations Po. Thom. B. Craighead Sprinhill. Po. James Brown, Lexington. Doct. Adam Rankin, Danville. Col^{nel} Alex. D. Orr, near Limestone. Maj. Gen. Benjamin Logan, Lincoln county. James Speed Jun^r Danville. Gen. Clark. Louisville. Joseph Simpson Lexington. Gouver^r Shelby Esq. Gov^r & Brigad. Gen. James Wilkinson.

M^r Robert m'a recommandé de voir M^r Tardibeau à Kaskakia de sa part.

Le 15 Juillet 1793 j'ai pris congé du Citoyen Genet, Ministre de la République de France pres les Etats-Unis et je partis de Philadelphie le même jour à dix heures du soir pour éviter les chaleurs trop considérables et voyager au clair de la Lune.

Le 16 étant en compagnie de . . . humeau et de . . . Leblanc nous avons fait 40 miles.

Le 17 passé par Lancaster et nous avons fait 35 Miles.

Le 18 passé par Carlisle, . . . M. et couché à Chipesbourg.

Le 19 nous vinmes coucher à Strasbourg . . . Miles.

Le Dimanche 20, parti de Strasbourg, petite ville située au pied des Montagnes ; un de nos chevaux étant malade, nous avons seulement fait 21 Miles : observé *Magnolia acuminata*, *Azalea octandra*, *Kalmia latifolia*, *Fagus castanea*, *Fag. pumila*, *Pinus 2-folia*, *3-folia*, *Strobus* : *Abies canadensis* ; *Quercus castaneaefolio* &c *Juglans nigra*.

Le 21 Juillet parti de Wells tavern, passé la rivière Juniata . . . et observé *Rhododendron maximum*, *Hydrangea frutescens*, *Trillium erectum* ; couché à Bedford. 21 Miles.

Le 22 parti de Bedford et déjeuné à 4 miles de distance ou la Route de Pittsburg se divise en deux. Nous avons pris la route à main droite et la Pluye nous a obligé d'arrêter et de coucher à douze M. seulem^t de Bedford.

Le 23 nous avons fait 24 M. et passé au sommet des Allegany.

Le 24 nous avons fait 25 M.

Le 25 nous avons passé par Green'sburgh et nous avons fait 31 M.

Le 26 Pluye, nous n'avons fait que . . . M.

Le 27 nous avons fait 19 Milles et nous arrivames à Pittsburgh.

Total 32* Miles de Philadelphie.

Le 28 visité M. H. Brackenridge Esq.

* Evident error ; perhaps 320 was intended.—C. S. S.

Le 29 herborisé ; reconnu sur les rives du Mononga . . . , *Dracocephalum Virginianum*, * *Bignonia radicans*, *Crotalaria alba*? Ces plantes croissent sur les bords de la rivière submergés lorsque les eaux sont hautes.

Le 30 dud. reconnu une Plante du Genre *Ziziphora* . . . *Cunila pulegioides*† *floribus tetrandris*; *Teucrium Canadense*, *Eupatorium arom.*, *Sigesbeckia* . . . ; *Verbenae plurae species*.

Le 1^{er} Aoust, herborisé et reconnu *Cassia Marylandica*; *Monarda didyma*; *Sanicula Marylandica*; *Triosteum perfoliatum*; *Sicyos angulata*; *Acer rubrum*, *saccharum*: *Campanula*, . . . ; *Cercis Canadensis*; *Menispermum Canadens.*; *Actaea spicata*; *Tilia Americana*; *Urtica divaricata*; *Arum triphyllum*; *Celtis occidentalis*; *Panax quinquefolium*; *Staphylea trifoliata*; *Azarum Canadense*; *Rhus typhina*, *glabra*, *vernix*, *copallinum*, *radicans*, *toxicodendron*; *Clinopodium vulgare*, *incanum*.

Le 2 Aoust reconnu *Aristolochia siphon seu macrophylla*; *Panax quinquefolium*; *Lobelia siphilitica*; *Convallaria plures species*: *Veronica* . . . *Oxalis stricta*.

Le 3 et 4 Aoust herborisé: *Cacalia* 2 especes, *Phryma leptostachia*; *Leontice thalictroid.*; *Lobelia siphilitica*, *inflata*, *cardinalis*; *Eupatorium perfoliatum*, *maculatum*, *odoratum* et *celestinum*; *Actea spicata*; *Podophyllum peltatum*; *Azarum Canadense*; *Hydrophyllum Canadense*; *Trillium cernuum*; *Panax quinq. fol.*; *Aristolochia Siphon*; *Menispermum* . . . ; *Sambucus Canadensis fructu nigro*; *Sambucus* . . . , *fructu rubro foliis tomentosis*; *Tilia Americana*; *Laurus Sassafras*, *benzoin*; *Robinia pseudocacia*, *Juglans oblonga*, *Jugl. hiccory*; *Platanus occidentalis*; *Acer rubrum*, *saccharum*; *Ulmus* . . . ; *Hamamelis* . . . , *Cynoglossum* 3 espèces; *Vitis vulpina*; *Dioscorea fructu infero*; *Teucrium Canad.*; *Scrophularia Marylandica*; *Dracocephalum Virg.*; *Dianthera* . . . , *Sophora foliis ternis stipulis lato-lanceolatis florib. coeruleis vexillo corollâ brevioribus*; *Mimulus ringens*; *Bignonia radicans*; *Cercis Canadensis*; *Fagus sylvatica Americana*; *Circaea Canadensis*; *Urtica inermis*; *Erigeron Canadense*; *Cornus florida*; *Rubus odorata*, *Rub. occidentalis*; *Penthorum sedoides*; *Cephalanthus occidentalis*; *Polygonum aviculare*, *hydropiper*, *amphibium*, *scandens*; *Sanguinaria Canadensis*.

Le 6 Aoust sur la rive de la rivière Monongahela opposée à Pittsburgh vu une mine de Charbon de terre, dont l'entrée paroît avoir 15 pieds d'épaisseur de ce mineral sans mélange; quelquefois on distingue entre les différentes couches une teinte ferrugineuse. Dans plusieurs endroits, on trouve des roches tendres qui paroissent bonnes pour pierre à repasser les gros instruments; leur nature me paroît être une réunion de particules sablonneuses, argilleuses, ferrugineuses avec des parcelles de mica très rarement.

Le sol est généralement aux environs de Pittsburgh argilleux et les

* *Physostegia Virginiana*, Benth.—C. S. S.

† *Hedeoma pulegioides*, Pers —C. S. S.

pierres au roches calcaires d'une couleur brune, étant composées de beaucoup d'argile vaseuse. Le sol entre les deux rivières sur lequel Pittsburgh est bâti, est un sol d'alluvion ; l'on trouve même dans les terres retirées pour creuser des puits à plus de 30 pi. de profondeur des pierres arrondies et usées par le roulis des torrens.

Le 9 Aoust préparé à partir, le conducteur du Boat sur lequel j'avois embarqué mon bagage vint me dire qu'il attendroit les Boats destinés à transporter les troupes, d'autant plus que le Boat paroissant trop chargé pour cette Saison dans laquelle les Eaux sont basses ; il y avoit apparence de Pluyes.

Le 10 la rivière parut diminuer.

Le 11, le 12 et 13 nous restames en attendant le départ.

Le 13 il arriva trois Boats des Illinois appartenant à M. Vigo. Ils étoient conduits par environ 30 François Canadiens ou Illinois rameurs.

Un François resident en Amerique dep. 14 ans. chargé d'envoyer des provisions de farine à la N^e Orleans me dit qu'il me donneroit des Lettres po. les Illinois adressées au Commandant du Poste de Sst Louis. Il est actuellement établi à Pittsbourgh et il se nomme Andrain. Ce nommé Andrain est dit-on associé avec un nommé Louisière ou Delousière expatrié de France po. avoir été connu dans le complot de livrer le Havre aux flottes réunies Angloises et Espagnoles. Ce Louisière est actuellement absent de Pittsbourgh. Il y a un autre François resident à Pittsb. M. Lucas de Pentareau excellent Democrate actuellement absent. Il passe pour un homme instruit [qui] possede la connoissance des Loix.

Pittsburgh est situé au confluent des deux rivières Monongahela et Alleghany. Ces deux rivières jointes ensemble forment l'Ohio ou la Belle Rivière. Il y a un beaucoup plus grand nombre de maisons sur la rivière Monongahela que sur celle Alleghany. Le nombre des maisons est d'environ 250 et tous les ans il augmente considerablement. L'on y voit encore les fossés qui servoient de retranchement au Fort bati par les François nommé Fort Duquesne. Les Anglois depuis y en avoient bâti un autre presque, à coté sur l'angle formé par la jonction des deux rivières. Il avoit été construit en briques et les Americains le font démolir po. employer les briq. à la construction des Maisons que l'on batit journellement au Fort Pitt.

Les Americains ont un Fort de Palisades situé derrière la ville sur la rive de la Rivière Alleghany ; il sert de Dépôt pour l'arrivée des troupes que l'on envoie contre les Sauvages et de Magazin pour les Munitions que l'on y envoie de Philadelphie.

Le Mercredi 14 Aoust, parti de Pittsbourgh et couché seulement à deux miles de distance à la pointe d'une petite isle sur la quelle j'ay reconnu *Acer negundo*, *rubrum*, *saccharum* ; *Evonimus capsulis glabris*.*

Le 15 reconnu à 20 Miles de Pittsb. *Pavia lutea*, *Panax quinquefolium* ;

* *E. atropurpureus*, Jacq.—C. S. S.

Un *Bryonia** planta monoica calyce 5-fido, corolla 5-partita florib. masculis spicatis axillarib. florib. femineis quoque axillarib. germine instructo spinis innocuis.

Notre course fut de 28 Miles.

Le 16 passé à 7 heures du matin la ligne qui sépare la Pensylvanie de la Virginie. Cette ligne est marquée par des arbres coupés de la largeur d'environ . . . pieds à droite et à gauche de l'Ohio ou la belle Rivière et cet endroit est à 45 miles de Pittsbourgh. Le même jour arrivé au soir à Buffalo Creek. *79 Miles de Pittsbourgh.*

Le 17 passé par Willing, 92 M. de Pittsb. cet endroit est habité par environ 12 familles, ainsi que Buffalo Creek. A cause du vent contraire, nous avons seulement voyagé 30 M.

Le Dimanche 18 Aoust 1793, vu plusieurs troupes de Dindes sauvages: le vent contraire.

Le 19 nous avons faits *50 Miles.* Il y a pas d'établissements entre Willing et Marietta, petit Bourg situé à l'embouchure de Muskingum riv. Nous avons couché au lieu nommé le Fort Harmar, situé vis à vis Marietta sur la rive droite de la riv. Muskingum. *Dianthera americana.*

Le 20 nous y avons passé la journée.

Le 21, nous avons passé par Little Kanhaway, Belpré et Belleville 34 Miles.

Le 22 nous n'avons vu aucun établissement. Reconnu *Polymnia canadensis*: *Acer rubrum foliis inferne glaucis*; *Acer negundo*, *Acer saccharum*, *Acer foliis rugosis nervis sublanuginosis*; *Annona triloba*, *Pavia lutea*, *Platanus occid.*

Le 23 passé par Great Kanhaway, situé à 4 Milles avant d'arriver à Gallipolis sur la rive opposée.

Le 23 nous avons arrivames à l'Etablissement de Gallipolis situé sur la rive gauche de la Belle rivière. Les maisons sont toutes construites de charpentes équarries et seulement entaillées par les extrémités au lieu de Mortaises. (*Log-house*)

Le 24 séjourné, rendu visite au medecin Petit. Il m'inspira le plus grand respect par son esprit, par son sçavoir et sa vertu. Il me parut que l'humanité est le seul motif qui le retient attaché à cette malheureuse colonie. Du nombre de 600 personnes venues po. s'y établir il en restoit environ 150.

Le Dimanche 25 parti de Gallipolis; à 35 Miles, reconnu *Iresine celosioides* sur les rives de la belle rivière aux rives submergées par les grandes inondations: Passé une petite rivière nommée Gay. Nous n'avons pas vu d'habitation: *40 Miles.*

Le 26, nous n'avons pas vu d'habitations; passé la rivière Scioto, . . . *Miles.*

* This is probably his *Sleyos lobata* (*Echinoeyatis lobata* of Torr. & Gray) which, according to the *Flora*, was detected by Michaux "in occidentalibus Pensylvanie, juxta fluvium Ohio." The "*corolla 5. partita*" is retained by Richard in his description.—C. S. S.

Le 27, vu un Etablissement de plusieurs maisons au lieu dit Three Islands, dix miles avant d'arriver à Lime Stone : ces Etablissements sont réputés les premiers dépendant du Kentucky. Nous arrivâmes vers le soir à Lime Stone.

Limestone est réputé le Port du Kentucky (Landing-place). L'on y débarque les marchandises qui sont envoyées de Philad. po. Danville, Lexington &c. Une petite ville établie depuis six ans à 4 Miles de distance sur la route de Lexington, se nomme Washington et est déjà très florissante, étant située dans un terrain très fertile.

Le 28, visité le Colonel Alexandre D. Orr.

Le 29 j'ay quitté les deux Compagnons qu j'avois eu depuis Philad. Ils continuèrent leur route pour aller jusqu' à Louisville et je m'acheminay par l'intérieur des Etablissements. Le Colonel D. Orr m'offrit sa Compagnie po. aller avec lui à Lexington, ou il se proposoit d'aller dans peu de jours.

Les 30 et 31 herborisé en attendant que l'on put avoir des chevaux po. le voyage de Lexington. *Guilandina dioica* ; *Fraxinus (quadrangularis)* ; *Gleditsia triacanthos* ; *Serratula praealta* ; *Eupatorium aromaticum*, *Crepis Sibirica* ? &c.

Le Dimanche 1^{er} Septembre 1793, Diné chez le Colonel Lee.

Le 2 diné chez . . . Fox et disposé mon bagage po. le depart.

Le 3 le voyage fut remis au Lendemain : Le sol aux environs de Washington est argilleux et noiratre très riche ; Les pierres sont de Substance calcaire bleuatre obscure, remplies de pétrifications, de coquillages marins. Les ossemens de ces animaux monstrueux que l'on avoit imaginé estre d'Elephants se trouvent dans les environs, Il est à présumer que ces ossemens ont appartenu à des Individus marins, par la grande abondance des débris des corps marins qui se trouvent réunis dans ces lieux.

Le 4 parti de Washington ; passé par un lieu dont le sol abonde en substances salines et ou les Buffalos se rendoient en abondance pour lecher les particules de Sel qui s'exhalent continuellement à la surface du Sol. Il y a en cet endroit des fontaines dont l'eau est acre, putrefiée, noiratre et remplie d'air mephitique qui se dégage au moindre mouvement du sol par les bulbes qui paroissent à la surface de cette fontaine en approchant. Les habitans des environs y établissent des fourneaux et des chaudières pour en retirer du Sel par l'ébullition des eaux. Nous avons fait 33 Miles.

Le 5 nous avons fait 27 miles et nous sommes arrivés de bonne heure à Lexington principale ville des Etablissements et de l'Etat de Kentucky. Nous avons passé par un petit Etablissement, réputé ville nommée Paris, capitale du comté (county) de Bourbon : Il y a environ 18 maisons Il y a des Etablissements de campagne au long de la route et les voyageurs vont actuellement sans danger de Lime Stone jusqu' à Lexington éloigné de Soixante six miles d'une place à l'autre. 66 Miles.

Le 6 visité deux personnes résidant à Lexington pour qui j'étois muni de Lettres de recommandation.

Le 7 herborisé

Le Dimanche 8 Septembre obligé de séjourner n'ayant pas trouvé un Cheval à louer.

Le 9 parti de Lexington, traversé des parties de bois entremêlées de Plantations très écartées. Passé la rivière Kentucky, dont les deux bords sont resserrés très étroitement, lorsque les eaux sont basses il y a plus de 100 pieds de hauteur du bord de cette riv. au haut des terrains qui la bordent et au travers desquels elle coule; l'on me dit qu'elle s'élève dans le temps des inondations à la hauteur de 40 pieds en un jour. Lorsque l'on y arrive l'on croiroit être entre deux rangs de Montagnes très escarpées, mais dans le fait ce n'est qu'un torrent ou une rivière dont le Lit est très profondément creusé. Les rochers des bords sont de substance calcaires. Plusi. arbustes et Plantes naturelles à la Caroline s'y trouvent à l'exposition meridionale garantie et préservés du froid par la situation favorable de cette grande profondeur de la rivière.

Le 10 arrivé à Danville et visité plusieurs personnes po. les quelles j'avois des Lettres : Le Colonel Barbée &c., Peter Tardivau Capit. homme d'esprit &c &c.

Le 11, visité le Général Benjam. Logan dont l'habitation est située à 12 Milles de Danville; Confidance de la Commission dont j'ay été chargé : Il me dit qu'il seroit charmé de prendre part à cette enterprise, mais qu'il avoit reçu depuis q. ques jo. une Lettre de J. Brown par laquelle on lui mandoit qu'il y a des negociations entamées avec les E. V. et les Esp. concernant la navigation du Mississipi et les Ind Creeks : Qu'un messenger avoit été env. à Madrid et qu'avant le retour au 1^{er} Decemb. prochain, ceux des E. Vins qui entreprendroient d'agir hostilement contre les Esp. seroient desapprouvés par le Gouvernement fédéral; Qu'il devoit partir le lendemain po. aller à son Etablissement de Bouskine Creek et qu'après q. j'aurois conferé av. le Gen. Clark, il eseroit qu'il lui feroit par des communications que je lui aurois fait po. en conferer de nouveau tous ensemble, &c &c.

Le 12 revenu à Danville.

Le 13 Visité (son Excellence) le Gouverneur de l'Etat de Kentucky, Isaac Shelby : visité les collines dittes Knob Licks : Vu plusieurs Plantes, particulier^{nt} aux parties salées qui se trouvent enclavées dans l'interieur du territoire du Kentucky. *Andromeda arborea*,

Le 14 parti de Danville po. Louisville, logé chez Cumberland à 19 M. de Danville.

Le Dimanche 15 Septembre 1793, à 22 Miles de Danville, trouvé une sorte de *Tragia*, Plante monoïque et fructification à la manière des *Euphorbia*s. Un peu avant d'arriver à Beardstown reconnu les roches et les pierres de substance calcaire et ayant toutes les formes de *Madrepores*. Le haut des Montagnes [collines] que l'on traverse 3 à 4 Miles avant d'arriver à Beardstown sont entierement de ces *madrepores* petrifiés. Reconnu beaucoup de Plantes qui ne se trouvent pas ailleurs, *Fagara* de l'Etat de New-York; *Rhamnus* (Carolinian) et *Rhamnus* . . . &c. &c. Les

environs sont très intéressants à être visité par un Botaniste. Diné à Beardstown et couché à 6 Miles plus loin. 31 Miles.

Depuis Beardstown, le pays n'est nullement intéressé po. un Botan. jusqu' à Louisville.

Le 16 arrivé à Louisville ayant voyagé par la nouvelle route. 29 Miles. En total 79 M. de Danville.

Le 17 Septembre visité le Gen. Clarke. Je lui remis les Lettres du Ministre et Je lui annonçais l'objet de ma Mission : Il me repondit que l'Enterprise en question lui tenoit fort à coeur, mais que depuis si long temps qu'il avoit écrit, n'en ayant point reçu de reponse, il l'avoit considérée comme abandonnée. Je lui dis que sa Lettre étoit tombée dans des mains étrangères et que le Ministre ne l'avoit reçue qu' indirectement après son arrivée à Philadelphie. Il me dit, qu'une nouvelle circonst. paroissoit y mettre obstacle.

Le 18 sejourné à Louisville et herborisé.

Le 19 returné visiter le Gen. Clarke.

Le 20 parti de Louisville, passé chez le Gen. Clarke, venu coucher près de Salt river.

Le 21 passé par Beardstown. *Evonimus ramulis quadrangulis capsulis muricatis.**

Le Dimanche 22 sep^{b^{re}} arrivé de nouveau à Danville à 5 heures du soir: Ecrit au Ministre Genet le même jour par la Poste de Philad^a.

Le 23 je me suis reposé.

Le 24 parti pour Lexington et couché au passage de Kentuckey river.

Le 25 je me suis aperçu que mon cheval étoit égaré ayant couché dans une auberge ou il n'y avoit pas d'Ecurie, le cheval avoit sauté par dessus la cloture et j'ay passé toute la journée à le chercher.

Pendant ce temps j'ay remarqué sur les plages sablonneuses : *Iresine celsioides*; *Mollugo verticillata*; Sur les rochers; *Heuchera Americana*; *Asplenium rhizoph.*; *Pteris nova*; *Parietaria* . . . ; *Hydrangea arborescens*. Sur les montagnes calcaires : *Serratula* 2 especes inconnues; *Cuphea viscosa*; *Didymia gymnosperma novum genus*; *Didym. angiosperma nov. genus*. Sur la bord de la rivière Dickson, *Dirca palustris*; *Sophora florib. coeruleis*. Dans les forets ombrag. &c *Acer fol. argenteis an rubrum?*, *Acer saccharum*; *Fraxinus fol. subintegris*, *Fraxinus foliolis serratis ramis quadrangularis*, *Gleditsia triacanthos*; *Guilandina dioica*, *Robinia pseudo-acacia*; *Evonimus ramulis subtrotundis, capsulis lævibus*.

Le 26 Septembre 1793, Pluye toute la journée; couché à une mile de Kentuckey river, chez . . . Hogan qui eut l'honnêteté de me prêter un cheval sans interest po. aller à la recherche du mien.

Le 27 arrivé à Lexington éloignée seulement de 20 Miles du passage de la rivière Kentucky dit Hickman jonction.

Le 5 Octobre parti de Lexington.

* *E. Americanus*, L.—C. S. S.

Le Dimanche 6 dudit arrivé à Danville. Le même jour écrit au Citoyen Ministre Genet.

Le 7 logé chez Puvit et reçu mon bagage.

Le 10 Envoyé un Messager à Louisville.

Le 13 Dimanche retourné à Lexington et revenu le Dimanche 20 à Danville. N'ayant pas reçu la réponse du général Clark, je n'ay pas pu profiter de la Poste pour écrire au Ministre à Philad^e.

Le 21 reçu la réponse du General Clark.

CAHIER 8. 1793, 1794 ET 1795.

Le 10 Novembre 1793, L'an 2^e de la Republique Française, parti de Danville pour Philadelphie apres avoir visité le Colonel George Nicholas Esq. pres Danville. Il insista sur le plan qu'il m'avoit proposé le jo. précédent relativem^t à la Navigation du Mississipi, Sçav : Que les Forees Marines de la Republique s'emparant de l'Embouchure du Mississipi, déclarassent le Pays leur appartenant à droit de Conquête et invitassent les Americains du Pays de l'Ouest à profiter de la liberté de la Navigation : Alors si les Espagnols situés plus haut sur le fleuve molestoient les Batimens de provisions transportées par les Americains, ceux-ci seroient en droit de repousser la Contrainte et la force par la force. Ainsi le Gouv. Esp. n'auroit pas sujet de plainte contre les Etats Unis d'avoir rompu, le pays étant réputé en possession de la Republique Française.

Couché à Crab orchard distant de Danville de 22 Miles.

Le 11 Novembre 1793 parti de Crab Orchard en compagnie de 12 pers. qui s'etoient réunies en cet endroit pour traverser les Bois inhabités et frequentés par les Sauvages. L'espace depuis Crab Orchard jusqu'à Houlston settlement est de 130 Mil. et se nomme Les Wilderness. Couché à Longford Station. 10 M.

Le 12 couché à Modnell St. 28 M.

Le 13 couché à Middleton St. 28 M.

Le 14 traversé des endroits bas, marécageux dont l'eau étoit brune et stagnante. A 6 miles du Poste Middleton et 18 miles avant d'arriver au haut de Cumberland Gap, vu une fougere grimpante qui occupoit plus de six acres de superficie du terrain pres de la route.* A cette saison ou la Gelée avoit produit de la glace de 3 à 4 lignes d'épaisseur, cette plante n'avoit nullement été endommagés. Dans le territoire il y a deux endroits désignés l'un par Flat lick et l'autre par Stinking Creek.

Vu autour d'une Charogne de Cerf le . . . Corbeau (*Corvus corax.*)
Davissas stat. 2 miles au . . . † Cumberland Gap 26 Miles.

Le 15 Novembre voyagé des parties de Montagnes tres elevées entre les

* *Lycopodium palmatum*, Swz.—C. S. S.

† Three words are here frayed away in the manuscript of the Journal.—C. S. S.

quelles nous avons traversé Clinch river et couché à Houlston St. chez le nommé . . . 27 Miles.

Le 16 cotoyé Houlston river et couché chez. . . . Amis Esq. à trois M. au de Hawkin Court house, 26 Miles.

Le Dimanche 17 la Pluye m'obligea de rester dans une petite Cabane près de North fork de Houlston 25 Miles.

Le 18 mon Cheval se trouva si fatigué de la rapidité et des mauvais chemins à travers les Wilderness que je fus obligé d'arrêter apres onze Miles de Marche seulement, 11 Miles.

Le 19 parti à la pointe du jour. Au pied de la maison ou je logeai, la route du Kentucky se divise, l'une à droite conduit à Burke court house, dans la Caroline Septentrionale passant par Mouth of Wataga river; l'autre conduit à Abington court h. première ville de Virginie. Mon cheval continuant d'être fatigué je fis seulement 20 miles.

Le 20 j'ay fait 15 Miles. arrivé à Abington.

Le 21 couché à 22 Miles d'Abington près de Seven Miles Ford: Branche du milieu de Houlston.

Le 22 Novemb. 1793 traversé Seven Miles ford: La riv. Holston est formée de trois Branches princip. scav. North fork, Seven Miles fork et South fork of Holston riv.

Dans l'espace de six miles apr. avoir passé cette petite riv., observé sur les Collines septentrionales qui bordent plusi. petites riv. le Pinus abies canadensis, Thuya occidentalis, Rhododendron maximum et aussi Magnolia acuminata dans les parties d'un sol tres riche: Fagus chinquapin; sol argilleux, roches Quartz ferrugineux, Ardoizes rares et Pierres calcaires entreveinées q.q. fois de Quartz blanc: Ecureuil gris: (oublié de faire mention que en passant à Abington vu une Tortue de 8 pouces de diametre petrifiée de substance calcaire noire comme les Roches qui abondent dans le territoire). Notre journée fut de 23 miles.

Le 23 Novembre couché chez un Allemand. Pendant la nuit mes chevaux ont été égarés: entre Abington et With Court house entre les Montagnes, Abies canadensis et Thuya occidentalis.

Le Dimanche 24, passé par With Court house et à 18 Miles environ dans les Montagnes escarpées, remarqué Pinus Strobus, Pinus fol. ternis (pitch pine), P. foliis geminis . . . , P. abies canadensis. Rhodod. maximum. Kalm. latifolia, Gaultheria procumbens, Epigea repens: Lieux plus arides, Fagus chinquapin, Fagus castanea americana, Fag. sylvatica am., Andromeda arborea, Hypericum Kalm. Dans les rochers humides ou arrosés par les ruisseaux: Roches de silex et même Agate un peu transparente.

De Seven Miles ford à With Court h. 36 M.

Le 25 passé par le ferry nommé Peper's ferry sur New River et ensuite traversé du coté Occidental sur le coté Oriental de Alleganies; couché sur une branche de James river nommée Catawba qui coule de l'Est au lieu que New River [qui] coule a l'Ouest des Montagnes.

Le 26 continué ma route vers Botetort Court-house 30 miles.

Le 27 passé par Botetort Court-h. et par la Branche méridionale de James river à 12 miles de Botetort.

Le 28 passé par Lexington à 40 M. de distance de Botetort et par la Branche septentrionale de James river à un Mille de Lexington, *Thuya occidentalis*, *Pinus Strobus*.

Le 29 Novembre, sejourné à la maison de MacDowall, mon cheval ayant la jambe enflée au point de ne pouvoir marcher.

Le 30 marché 27 miles.

Le Dimanche premier Decembre 1793 passé par Stanton, petite ville assés florissante située à 120 M. de Richemont et 75 Miles de Botetort.

Le 2 passé par Rockyham ou Rockytown 20 miles de distance de Stanton.

Le 3 passé par Woodstock autre petite ville à 37 M. de Rockytown. Entre Stanton et Woodstock le terrain est montagneux, le sol assés fertile, substance argilleuse et pierres calcaires nommées Blue lime stone : *Quercus rubra*, *alba* ; *Fagus chinquapin* et *Pinus foliis geminis*, *conis squamis rigidis et aculeatis*. A trois miles avant d'arriver à cette ville sur au Nord d'une Colline sur la route, *Thuya occidentalis* : *Pinus fol. geminis* : *Junip. Virginiana*.

Le 4 parti de Woodstock, passé par Newtown.

Le 5 passé par Winchester, 35 Miles de Woodstock. nommée cy devant Miller'stown.

Le 6 passé par Charlestown 22 M. de Winchester. Passé par Harspur ferry sur Potomack river 8 miles de Charleston et entré en Maryland.

Le 7 passé par Fredericktown 20 M. du (Potomack river) ferry Harspur et 50 miles de Winchester.

Le Dimanche 8 passé par Woodberry et Little town 35 M. de Fredericktown.

Le 9 passé par Hanover cy dev^t MacAllister town 42 M. de Fredericktown et par Yorktown 18 M. de *MacAllistertown actuellement Hanover town*.

Le 10 passé par Susquehanna river et entré en Pensylvanie onze miles de Yorktown. Passé à Lancaster 12 miles de Harris ferry sur Susquehanna river et 24 miles de York.

Le onze Decembre 1793 voyagé 30 Miles.

Le jeudy 12, arrivé à Philadelphie 66 miles de Lancaster.

Le 13 visité le Citoyen Genet, Ministre Plenipotenciaire de la Republique française.

Le 14 Visité M^r Jefferson, M^r Rittenhouse & . . .

Le 15 Dimanche ; Recapitulation de la route sçavoir :

De Danville à Lincoln	12 miles
De Lincoln à Crab Orchard	10
De C. à Langford station	10
De Langford à Modrell St.	28

60 M.

Suite	60 M.
M. à Middleton St.	28
M. à Cumberland Gap	24
Cumb. à Davissess St.	2
D. à Houlston	27
H. à Hawkin C. house	22
Hawkin à . . . Amis	3
Amis à N. fork of Houlston	25
N. fork à la fourche de la Caroline	31
De la fourche à Abington Devant Washing- ton Court House en Virginie	15
D'Abington à Seven M. fond	} 60*
De seven Miles fond à With court house	
De With C.h. à Peper ferry	33
De Peper ferry à Botetout C.h.	50
De Boteton à James River south fork	12
De James riv. S. fork à Lexington	28
De Lex. à Stanton	35
De Stanton à Rocky town	20
Dy Rockyham à Woodstock	37
De Woodstock à Winchester	35
De W à Charleston	22
De Ch. à Harpur ferry ou Potomack	8
Du Potomack à Fredericktown	20
De Freder. à Littletown	35
De L. à Hanover cy-dev. MacAlister	7
De Hanover à York town	18
De York à Susquehanna Harris ferry	11
De Susquehanna à Lancaster	12
De Lancaster à Philadelphie	66

Total 746 M.

De Danville a Lexington 33 M.

De Danville a Louisville 84 "

Le 16 Dimanche 1793 diné chez le Ministre Genet.

Le 17 Envoyé mes chevaux chez Bartram.

Le 18 visité le D^r Colin, ministre de l'Eglise Suedoise.

Le 19 visité M^r Peale gardien du Museum.

Le 20 dépouillé plusieurs écureuils.

Le 21 changé de logement.

Le 22 Dimanche rédigé mes Comptes.

Le 23 Vu le Ministre Genet et le Cit. Bournonville.

Le 24 Visité mes Graines, je les ay divisé po. les envoyer en France en deux Envoys differens.

* The manuscript is so frayed that the figures for these two distances are destroyed. The footing requires 60 M. for the two.—C. S. S.

Le 25 travaillé à mettre en ordre mes collections de Kentucky.

Le 26 visité M. Rittenhouse President de la société Philosophiq.

Le 27 écrit et occupé d'Objets indifferents.

Le 28 visité M. Jefferson, le Minist. Genet. &c.

Le Dimanche 29 chassé aux oiseaux.

Le 30 dépouillé et embourré les oiseaux tués le jour précédent.

Le 31 j'ay été occupé toute la journée à écrire.

1794.

Le Mercredi premier Janvier j'ay été à la chasse aux oiseaux, tué deux Crossbills et je les ay dépouillés et embourrés.

Le 2 j'ay fait des visites et j'ay appris l'arrivée à Baltimore d'un Navire du Havre de Grace ayant des nouvelles favorables à la République Française.

Le 3 j'ay été informé de me préparer au voyage de la Caroline et j'ay été prevenir Bartram le Botaniste de me donner la liste des Plantes qu'il désire.

Le 4 Janvier 1794 j'ay visité le D^r Barton* et il m'a preté le Systema Naturæ de Linn.

Le Dimanche 5 copié et fait un extrait de l'histoire des Mammalia et Quadrupedes et de celle des Oiseaux.

Le 6 j'ay porté au Citoyen Bournouville mes Comptes des Dépenses de mon voyage au Kentucky et il m'a dit de revenir le sur lendemain étant trop occupé.

Le 7 j'ay continué l'Extrait du Systema Naturæ.

Le 8 et le 9 j'ay continué le même ouvrage.

Le 10 le Citoyen Bournouville n'avoit pas encore le temps de vérifier mes Comptes.

J'ay remis au Citoyen Minist. les Brevets en Blanc qu'il m'avoit confié pour le General Clark : Plus un Memoire sur l'état de la Recolte relativement aux approvisionnement de Bleds pour la France. Il me declara que le voyage de Caroline n'étoit plus aussi important qu'il avoit supposé. Je lui dis que je desirois employer mon temps aux recherches en Hist. Naturelle le mieux possible, mais que si pour le service de la République, le Ministre avoit un autre objet en vue je m'y employerois sinon je souhaitois aller en Caroline pour retirer et mettre en Ordre mes Collections. Il accepta ma proposition et me dit qu' a mon retour il me donneroit une commission pour le Kentucky. Il me recommanda de visiter dans l'interval les Deputés de l'Etat de Kentucky au Congres.

Le 11 Janvier 1794 j'ay été occupé toute la journée à écrire.

Le Dimanche 12 Visité M^{me} Brown et Colon. Orr Membres du Congres, deputés de l'Etat de Kentucky. Je conferay av. eux sur les dispositions du Gouvernem^t Fédéral et sur l'execution du Plan du Gen. Clark.

* Probably Dr. Benjamin Smith Barton, whose *Collections for an Essay towards a Materia Medica of the United States* was published in Philadelphia in 1798.—C. S. S.

Le 14 j'écrivis au Gen. Clark po. lui marquer les intentions du Ministre et po. lui envoyer 400 Dolls.

Le 16 touché lad. s^e de 400 Doll et . . .

Le 17 et 18 écrit plusi. lettres à différentes personnes de Kentuckey et . . .

Le 18 redigé un mémoire pour une Motion à faire à la Société des Amis de la Liberté et de l'Egalité à Philad^e afin d'adviser aux moyens d'adoucir le sort des prisonniers françois entre les mains des Anglais,

Le Dimanche 19 dépouillé et embourré plusi. oiseaux.

. *

Le Dimanche 9 fevrier 1794 parti de chez Bartram, la neige tomba toute la journée, m'obligea de rester et de coucher à 7 miles de Philadelphie.

Le 10 couché à Wilmington 28 M. de Ph.

Le 11 couché à 24 Miles de distance.

Le 12 neige presque toute la journée.

Le 13 observé plusi. Mesanges ayant beaucoup d'affinité à la Mesange bleue : *Parus coeruleus* : arrivé à Baltimore.

Le 14 ayant été obligé d'acheter un Cheval et de vendre le mien je sejourney.

Le 15 parti de Baltimore, vu plusi. oiseaux . . . dont le Male a l'extrémité des plumes inférieures des Ailes, terminée par un rouge de laque ou cire à cacheter, l'extrémité de la queue jaune, le corps cendré, hupé sur la tête, tour des yeux d'un noir foncé velouté, il se nourrit de *Diospiros* dans cette Saison ; Vu plusieurs oiseaux . . . Blue birds par les Americains. Terrain sablonneux, mêlé d'une argille Ochracée et abondant en mines de fer. Il y a plusi. mines de fer sur la Route qui sont exploitées dans cette partie du Maryland. Le Chêne noir se trouve frequemment ici.

Le Dimanche 16, entre Bladensburg et Alexandrie, sol sablonneux quelquefois argilleux très rouge : Mines de fer : Oiseaux, *Parus americanus* ♂ ayant la partie supérieure du corps noiratre et la partie intérieure grise, ♀ grise. Cet oiseau paroît ne vivre que de graines, de Plantes herbacées comme *Sarothra gentianoides* † &c. Il est habitant des bois, mais il abonde au long des hayes et des clotures, s'associe avec le petit moineau (friquet d'Amérique,) pendant l'hiver &c. *Parus* . . . oiseau qui a une très grande affinité avec la mesange bleue de France, paroissant ne pas se nourrir de graines mais voltige et passe de branches et d'arbres successivement avec une vivacité et une rapidité particulière à cet oiseau . . . Cardinal de la Caroline, cet oiseau habite l'hiver aux lieux sablonneux, dans les Carolines, dans la Virginie et même dans les parties basses et maritimes du Maryland dont le sol est sablonneux. Je le vis à 15 Miles avant d'arriver à la rivière Potomack qui separe le Maryland de la Virginie.

* A blank leaf occurs here in the Journal covering the time between Jan. 19 and Feb. 9.—C. S. S.

† *Hypericum Sarothra* Michx.—C. S. S.

Je vins coucher à Alexandrie 1^{ere} ville de la Virginie située sur le coté meridion. de la rivière Potomack.

Le 17 sol alternativement argilleux et sablonneux ; vu le Friquet d'Am, le Cardinal, le Moqueur, les 2 especes de Mésanges citées précédemment. Pin à 3 feuilles* aux environs de Dumfries. P. à 2 feuilles dont les écailles apres la chute des sem. ne sont pas recourbées, mais seulement écartées et concaves, f. plus longues droites, grand arbre. Cet arbre est le même qui abonde en q. q. endroits des Carol. Vu aussi aux lieux froids montagneux et arides le Pin à 2 f. † Ecailles a éguillons beaucoup plus rudes q. ceux de l'espece precedente, Ecaill. recourbées (recurvatæ) f. pl.^e courtes et un peu contournées. Cette espece se trouve sur les Collines au long de la riv. Schuylkill en Pensylvanie : Couché Dumfries. 28 miles d'Alexandrie.

Le 18 passé par Fredericksburg.

Le 19 passé par Bowlinggreen et Hanover court house. Depuis Fred. jusque vers Hanover Court house le sol est sablonneux, abonde en Pins à 2 et à 3 feuilles entremêlées sur la même branche ; Cones de moindre grosseur q. le P. à 3 f. de la Virginie méridionale et dont les écailles sont molles, éguillons peu sensibles. Vers Bowlinggreen situé à 22 M. de Fredericksburg, commence le Pin à 3 feuilles, ‡ Pinus dont les Cones sont à écailles rudes, feuilles assés longues en tout, il est un diminutif du Pin à longues feuil. dit P. palustris et je le nomme Pin à 3 f. de la Virginia meridionale et de la Caroline.

Le 20 depuis Hanover court house jusqu' a Richemont 22 Miles.

Le 21 Parti de Richmont ; à un mile et demi sur la route de Petersburg, vu l'Orme d'Amériq. § à écorce fongueuse, cette écorce n'environne pas la tige, mais forme deux ailes ou membranes plattes ayant une intersection aux endroits d'ou sortent les bourgeons : C'est le même Orme que j'ay vu en abondance en Kentuckey entre Louisville et Beardstown. A 9 Miles pres d'un Ruisseau ou petite Riv. remarqué le . . .

A 12 miles vu la Smilax laurifolia et la Smilax baccis rubris dans la même nature de terrain q. ceux ou l'on trouve ces Plantes en Caroline ; à 20 Miles vu Ilex æstivalis ; couché à Petersburg 25 M.

Le 22, à 18 miles vu le Bignonia crucigera, Vaccinium arboreum ; à 30 Miles vu Laurus|| æstivalis et très frequemment Vacc. arboreum et Ilex æstivalis. Au long des Riv. remarqué plusi. fois Ulmus à écorce fongue-

* *Pinus rigida*, Miller, is not included in Michaux's *Flora*, although the fact that he describes his *Pinus serotina* as growing "in *humilis Carolinae et Pensylvanie Cupressetis*," would indicate that he was familiar with it at least in Pennsylvania where *P. serotina* is not found. It is difficult to understand how such a common tree should have escaped his attention in New York, New Jersey and Maryland.—C. S. S.

† *Pinus pungens*, Michx. This is the first mention, apparently, of this species.—C. S. S.

‡ *Pinus Teda*, L.—C. S. S.

§ *Ulmus alata*, Michx.—C. S. S.

|| Originally written *Ilex* in the Journal. This was erased and *Laurus* substituted.—C. S. S.

use. Le Cunila . . . cesse entre Petersburg et Halifax, 38 miles de Petersburg à Tompink Shop ou j'ay couché.

Le Dimanche 23 fevrier 1794 la Pluye m'empecha de partir avant 11 heures ; passé par Hixis ford, petit hameau à 28 miles de distance de Halifax qui est la 1^{re} ville de la Caroline Sept. La ligne sur cette route qui separe la Virginie de la Carol. Sept. est à 12 M. d'Hixis ford et à 16 miles d'Halifax en Caroline. A 10 Miles d'Hixis ford et 2 miles avant de sortir du territoire de la Virginie, vu le *Bignonia sempervirens* près du Creek nommé Fontaine Creek, Vu aussi l'*Hopea tinctoria* un mile avant d'entrer en Caroline. A un mile de distance de la Ligne qui separe la Virg. de la Caroline et sur le territoire de la Carol. vu le *Cyrilla racemiflora* dans un très grand marecage, trois miles avant d'arriver à la Taverne de Pater-son ou j'ay couché 16 miles d'Hixis ford et 12 M. d'Halifax : 23 Miles.

Le 24 à 10 Miles d'Halifax et six Miles de dist. de la Ligne entre le Virgin. et la Carol, commence le *Pinus palustris*, fol. longissimis, conis majorib. Le *Quercus palustris* à f. deltoides* commence aussi en cet endroit. Le P. a 3 f. † longues, mais cones de moyenne grosseur qui commence a Bowling-Green se trouve parmi ainsi q. le Pin à deux et trois feuilles. ‡ Le *Bignonia crucigera* et le *Bign. sempervirens*, *Hopea tinctoria* se voyent en abondance après q. l'on a passé au sud d'Halifax ainsi q. *Nyssa dentata* et *Cyrilla racemiflora* dans les Swamps. Couché à Endfield court house chez le Col. Brandt 25 Miles.

Le 25 diné chez le Col. Philipps seize Miles et passé Tar River à 4 M. de distance au lieu dit *Tetts brige* : Vu un *Sophora* dit Yellow Lupin dont les tiges etant dessechées, j'ay recueilli les graines qui restoient dans les gousses rassemblées en épis : Douze miles plus loin passé *Town creek brige* et couché à 8 M. au de la. 35 Miles.

Le 26 sol toujours sablonneux, couverts de Pins dits *Pinus palustris* : ces Arbres sont entaillés et l'écorce enlevée, mais une partie du bois de la longueur de deux pi. sur un pied de large. Au bas l'entaille est plus profonde po. retenir la resine nommée *turpentine*. L'on enleve la *Terebentine* lorsq. le bassin formé par cette entaille profonde est plein. Douze miles avant d'arriver à Peacock brige, commence le *Laurus borbonica* § et trois miles avant Peacock brige commence l'*Andromeda Wilmingtonia* ; || le *Stewartia malaccodendron* ¶ se trouve aux environs dud. Peacock brige. Il y a 21 miles environ de Town creek brige à Peacock brige. Les trois especes de *Myrica* des Carolines commencent dans ce Canton ainsi q. la grande *Rhexia* de Caroline.**

Le 27 voyagé vers News River au lieu dit Whitefield ferry passant par

* *Quercus aquatica*, Catesb.—C. S. S.

† *Pinus Taeda*, L.—C. S. S.

‡ *Pinus mitis*, Michx.—C. S. S.

§ *Persea Carolinensis*, Nees.—C. S. S.

|| *Andromeda spectiosa*, Michx.—C. S. S.

¶ *S. Virginica*, Cav.—C. S. S.

** *R. glabella*, Michx.—C. S. S.

la maison de . . . Environ 24 miles de Peacock brige à Whitefield ferry.

Le 28 voyagé depuis Whitefield ferry jusqu'à Duplaine Court house ou Dixon. 31 Miles : Quinze miles avant d'arriver à Duplaine Court house, commence l'Andromeda axillaris, c'est à d. 65 miles nord de Wilmington. Vu aussi en abondance le Vaccin. fol. sempervirentib. *caule repente, fructu nigro : Vu en abondance Andr. Wilmingtonia, paniculata, racemosa &c. Bignonia crucigera, sempervirens, radicans et Catalpa.

Le Samedi 1^{er} Mars, vu l'Andromeda nitida ou lucida des Swamps des Carolines, il commence à quarante cinq miles Nord de Wilmington. Vu en abondance And. Wilmingtonia, axillaris, racemosa et nitida : Passé par Washington 8 miles de Duplaine court house, le Gordonia commence 3 M. au N. de Washington, environ 38 M. nord de Wilmington. L'Ilex angustifolia . . . comm. 26 miles au nord de Wilmington. Il y a environ 35 M. de Washington court house à Wilmington.

Le Dimanche 2 Mars, j'ay vu dans les Sables arides Lupinus perennis et Lupinus pilosus, Atraphaxia ?, † arbuste tiges grêles, feuilles charnues, persistentes l'hiver, Vaccinium sempervirens &c. Vu par Bartram sur la route de Warmspring, le Chamærops acaulis commence à 15 miles au Nord de Wilmington. Olea americana se trouve aux environs de Wilmington et commence dans ce territoire. Stillingia herbacea commence à 30 M. au nord de Wilmington.

La Pluye m'obligea de coucher à 8 M. de Wilmington.

Le 3 arrivé à Wilmington ; mon cheval étant excessivement fatigué je fus obligé de me reposer q. ques jours : Vu M. Verrier français des Isles, vray Republicain ainsi q. le Docteur LaRoque établi à Wilmington. M. Josselin tenant la Gr. Tavernne à Wilmington est un grand ami de la Republiq. française.

Le 4 j'ay été aracher un Andromeda que j'avois remarqué quatre ans auparavant ainsi que l'Ixia ?‡ de la Caroline et j'ai fait une Caisse de ces Plantes pour les envoyer par mer sur le Navire du Capit. Mitchell, Sloop . . . à Charleston.

Le 5 emballé mes collections et mis à bord du Navire.

Le 6, la Pluye m'obligea de différer et aux environs de Wilmington je vis : Dionæa muscipula, Olea americana, Andromeda mariana, paniculata, racemosa, axillaris, nitida, Wilmingtonia ; Vaccinum arboreum, repens, fructu nigro &c, Bignonia sempervirens, crucigera.

Le 7 Mars parti de Wilmington, passé par Town Creek 12 Miles ; Par Lockwood folly 15 M. de T. Creek (Par charlott brige 8 Miles)

Le 8 passé par Charlott brige et par W Gauss Esq. (jambe de bois) 13 M. de la Tavern Ross ou Lockwood folly.

Le Dimanche 9 parti de chez Foster. Violent aristocrate. Au bord de

* *V. crassifolium*, Andr. (*V. myrtifolium*, Michx).—C. S. S.

† *Poddygonella parvifolia*, Michx. ?—C. S. S.

‡ *Nemaulyia calentina*, Nutt—C. S. S.

la mer vu *Pisonia** inermis Arbrisseau baccifere, branches et feuilles opposées. Il commence dans la Caroline septentrionale et il se trouve en Caroline méridionale, dans la Georgie et dans la Floride &c . . .

Vu aussi la *Magnolia grandiflora* à 6 miles nord de distance de la Ligne qui sépare les deux Carolines. A onze heures et demie, je suis entré dans la Caroline Meridionale ; à Midi passé par un Petit hameau composé de 4 à 5 Maisons sur le bord de Little river habitée par deux françois Democrates à qui j'ay eu la satisfaction d'apprendre les dernieres nouvelles favorables à la Republique française ; l'un d'eux nommé Jouvenceau en buvant avec un Americain Tauris† qui parloit avec mépris de la Revolution française, lui porta deux coups de Poings et l'Am. se vengea en lui lachant un coup de fusil dans le ventre. Ce Jouvenceau étoit un vieux soldat et il étoit au lit malade. Le Chirurgien esperoit q. le malade en réchapperoit non obstant le danger du malade. Led. Foster ne tient point tavern et de W^m Gauss Esq^r chez Green il y a 15 Miles (Il est important po. les Voyageurs de faire provisions d'un demi Gallon de Mays ou de Riz non battu, car . . . Couché chez Wren 9 M. de chez Green.

Le 10 Passé sur Long Bay, au milieu environ 9 miles de distance de Wren, dejeuné chez la V^e . . . comme la plupart des habitans sur cette Route ne tiennent point Taverne, mais recoivent les Voyageurs, l'on ne peut pas exiger de la nourriture po. le Cheval, et je fus obligé de me contenter av. une Reception très honnête, mais mon Cheval se passe [sans] déjeuner. Le même jour je vins coucher chez M^r MacGill qui a épousé une fille de la famille Balouin françois réfugié autrefois po. la Religion. Je fus très bien reçu dans cette Maison. Mais je fus obligé d'acheter des Negres du Riz pour la nourriture de mon cheval.

Le onze à 12 Miles de distance dejeuné chez le D^r Mazie et heureusement la provision de Riz que j'avois emporté procura à déjeuner à mon Cheval excedé par la fatigue dans les sables steriles que l'on trouve pendant plusi. jours : j'arrivay enfin à Pittcock ferry, 23 M. de dist. de chez MacGill. Mon Cheval ne pouvoit plus aller. Ce ferry est un peu plus bas q. George town et il y a un Mile et demi po. traverser la Riv. et 4 M. po. arriver à Georgetown. Couché à la maison du ferry mauvaise auberge mais mon cheval fut bien soigné.

Le 12 Mars 1794 traversé la rivière à la pointe du jour et je vins déjeuner chez Cooke au lieu dit Cook's ferry sur la rivière Santee 12 miles de distance de Wackamaa river.

Diné chez la V^e Morell (très bonne auberge po. les Chevaux). Je couchay à cet endroit 10 M. de distance de Cook's ferry ; en tout 22 miles sans les passages de rivière tres longs et souvent dangereux.

Le 13 parti de chez la V^e Morell ; à 7 miles détourné à droite po. venir à Manigault plantation: de Mauig: passé à Wiggfall plant., Vu une plante *Justicia*? un peu avant d'entrer sur le champ cultivé vers le milieu à

* It is not evident to what plant this refers, as no *Pisonia* is found as far north as the boundary between the Carolinas.—C. S. S.

† Tory.—C. S. S.

gauche la route conduit au ferry de Clement: 5 Miles de distance de Wigg-fall. Vu Andromeda Wilmingtonia. Le soir arrivé à Clement's ferry par une route sablonneuse sans auberge et la plus désagréable et la plus inhospitable que l'on puisse voir depuis Philadelphie jusqu'à Charleston: 32 miles environ de Morell tavern à Clement's ferry.

Le 14 arrivé à Charleston 5 miles de Clements ferry. En general dans toute la Basse Caroline Septentrionale, Meridionale et la Georgie, les routes sont sablonneuses, dangereuses au temps des Pluyes qui entraînent les Ponts; les Auberges sont très mauvaises, souvent il n'y en a pas aux habitations, l'on trouve q. quefois à déjeuner ou à diner même gratuitement, mais l'on seroit considéré incivil de demander de la nourriture po. le Cheval; le meilleur moyen est d'en porter avec soi quand l'on trouve à en acheter soit du Mays ou du Riz dit *Rough rice*. Lorsque je pouvois en acheter des Negres, je n'étois jamais dépourvu, c'est po. quoi il faut toujours avoir de la petite monoye.

Le dit: Visité le Citoyen Mangourit Consul de la Republique française.

Le 15 Visité le Jardin Botaniq. que j'avois confié aux soins du Jardin. avant mon départ pour le Canada.

Le Dimanche 16 diné chez le Citoyen Consul Mangourit.

Le 17 je revins à mon habitat. et je reglai plusi. ouvrages relativement à la Culture.

Le 18 je requs la Collection des Plantes que j'avois envoyé de Wilmington et je les plantay.

Le 19 je fis transplanter un grand nombre d'arbres.

Le 20 même travail.

Le 21 même travail.

Le 22 conferé avec M. Mangourit sur l'expédition projetée par le Ministre Genet pour la conquête de la Floride Orientale et de la Floride Occidentale.

Le Dimanche 23 herborisé.

Le 24 herborisé et travaillé au Jardin; taillé et émondé les arbres de la Pepinière.

Le 25 taillé et émondé et reglé au jardinier les ouvrages à faire dans le cours de la semaine.

Le 26 je fus à Charleston.*

Le 14 Juillet 1794 partit de l'habitation et couché à Monks corner; remarqué près du Pont de Goose Creek; *Eryngium foliis lanceolat.*

Le 15, à deux mille de Monks-corner, *Menispermum*. . . . *Smilax laurifolia* en fleur; Passé par Youta spring et ensuite prenant la Route de Manigault ferry couché à 5 [3?] M. de distance. Remarqué souvent *Serratula fistulosa*, *Heliotropium* . . . ; *Sida* . . . *Rhexia* . . . *basal cortice fungoso*.

* Here follow several blank pages in the Journal. The next entry is dated July 14.—C. S. S.

Le 16 passé Manigault ferry à cause du débordement des eaux qui nous empêcha d'aller par Neilson ferry ; la Pluie dura toute la journée et nous vinmes coucher à l'entrée du Territoire dit high hills Santéé.

Le 17 Juillet 1794 traversé high hills santéé ; Remarqué Phlox . . . ; *Coreopsis verticill. fol. ovatis* ; *Carduus Virginicus* . . . Nous vinmes coucher à Stateborough. Terrain argilleux en partie et meilleur : Chêne rouge à longs petioles, glands courts sessiles et grossiers ; ce n'est pas le même de Pensylvanie et du Canada et il est le vrai Chêne ecarlatte de Wangenh.

Le 18 passé par Cambden. En sortant de Cambden po. aller dans la Carol. Septentrion. on trouve à deux mille de dist. des Sables dits Pine barrans. A 4 ou 5 mi. il y a un Creek ou ruisseau (swamps) rempli de *Sphagnum*, *Azalea*, *Eriophorum* et autres Pl. aquatiques parmi lesquelles sur le bord de la route l'on trouve un *Kalmia** qui n'a été décrit de personne précédem^{nt} et probablement il n'a jamais été vu : Plante de la 9^e classe *Sophora* à fl. jaune : *Carduus Virginicus* : *Lupinus pilosus* ; Couché un mile au de la de cette Swamp et six miles de Cambden.

Le 19 passé par Johnston house et couché chez W^m Gram 35 Miles.

Le Dimanche 20 Juillet déjeuné 3 M. avant d'arriver ch. John cry et couché 7 M. plus loin, maudite et detestable Tavern chez Huston.

Le 21 parti de grand matin, la Pluie nous obligea d'arrêter plusi. fois. Couché chez John Spring M^d de Chevaux, homme riche, honnête homme et dont la maison est très honnête, et très décente. Remarqué *Rhus glabrum*, Rh. a f. ailées entre les folioles ; † *Individus* ♂ et ♀ ou plutôt ♀ sur des pieds différents ; *Rhus* . . . *Delphinium* . . .

Le 22 passé par Charlotte en Mecklenbourg, sol argille rouge, Pierres Quartzseuses : Eaux claires au lieu que cy devant ; les Eaux ont la couleur de feuilles mortes ou Tabac sec : Végétation Chêne rouge, noir, blanc &c. &c. *Actea spicata*.

.
Couché à six miles de Tuck-a-Segee ford.

Le 23 passé par Ben. Smith situé à vingt miles de Charlotte. Deux et trois miles avant d'y arriver vu le *Magnolia tomentoso-glauc* fol. cordatis longiorib: *Stewartia nova* ? ‡ Couché à six miles de B. Smith.

Le 24 passé par Lincoln et diné chez Reinhart : *Calamus aromaticus* : couché chez le vieux cordonnier . . .

Le 25 passé chez Henry Watner, maintenant Robertson.

Le 26 arrivé à Morganton cy devant Burke court house 30 M. de Robertson. Frutex *Calycantha* facies &.

Le Dimanche 27 Juillet 1794, sejourné à cause de la Pluie et des (Creeks) Torrens que l'on ne pouvoit traverser qu'a la nage.

Le 28 sejourné.

* Probably his *Kalmia cuneata*, *Flora*, 1. p. 257.—C. S. S.

† *R. copallina*, L.—C. S. S.

‡ Probably *S. pentagyna*, L'Her.—C. S. S.

Le 29 parti et couché chez John Ratherford pres de la maison du quel passé sur un Pont Muddy Creek.

Le 30 revenu dans la route ordinaire qui conduit à Turkey cove et arrivé chez le nommé Ainswort.

Le 31 herborisé sur les Lineville hautes montagnes au Sud-Est de l'habitation d'Ainswort et sur Rochers et les montagnes dénuées d'arbres recueilli un petit arbrisseau *Clethra buxifolia* ?*

Le Vendredy premier Aoust herborisé sur des Montagnes dont le sol est tres riche, situées au N.-Est : *Veratrum viride*, album? *Convallaria majalis*, *Convallaria*? *umbellata*; mesuré un Tulipier de 23 pieds francois de circonference.

Le samedy 2, herborisé aux Montagnes du Nord; *Convallaria umbellata*, † fol. integris margine et . . . ‡ lanuginosis, floribus umbellatis, baccis cœruleis; *Conv. racemosa*; § *Conv. multiflora*, || *Conv. majalis* fol. integerrim. nudis florib. racemo simplici secundis baccis cœruleis.

Le Dimanche 3 Aoust 1794, herborisé dans les Cyperoides et autres plantes aquatiques.

Le 4 préparé au voyage de la Montagne noire (Black montain).

Le 5 differé à cause du manque de provisions.

Le 6 parti et arrivé au lieu dit Crab tree : Plantes remarquées *Azalea lutea*, ¶ *stylis longissimis*; *Veratum viride*, album.

Le 7 herborisé sur les montagnes aux environs de Crabtree : *Clethra montana*; *Cassine* . . . ; *Rhodod. maximum*; *Kalmia latifolia*; *Convallaria bifolia*; *Trillium cernuum* baccâ coccineâ; *Magnolia auriculata*, acuminata flore glauca; *Frutex Azaliae* facies; *Vaccinium*** fol. margine ciliatis, superficie reticulatis pedunculis axillarib. unifloris corollis revolutis, 4-partitis, staminibus 8, Germine infero baccâ pyriforme coccineâ quadriloculari : *Cypripedium calceolaria* duae species, *Veratrum viride* (sur les collines), album; *Melanthium* . . . *Veratrum luteum* dans les Ruisseaux; *Spiraea* (*paniculata*) *trifoliata*; †† *Robinia pseudo-acacia*, viscosa, hispida: *Monarda coccinea*, dans les ruiss. *fistulosa*; *Quercus prinus-glauca*.

Le 8 herborisé *Hamamelis* . . . *Nyssa* . . . *Halesia tetraptera*; *Convallaria majalis*? baccis flavis; *Conv. umbellata* baccis coeruleis.

* *Letophyllum buxifolium*, var. *prostratum*, Gray?—C. S. S.

† *Clintonia umbellata*, Torr.—C. S. S.

‡ The word is illegible in the manuscript.—C. S. S.

§ *Smilacina racemosa*, Desf.—C. S. S.

|| *Polygonatum biflorum*, Ell.—C. S. S.

¶ *Azalea calendulacea*, Michx.—C. S. S.

** *Vaccinium erythrocarpum*, Michx. The fruit of this species, however, when fully ripe is quite black and not scarlet as described here and in the *Flora*: a mistake which has been often copied by American botanists since the days of Michaux. In Watson's *Dendrologia Britanica*, I, 31, t. 31, it is described as black, and correctly figured.—C. S. S.

†† *Gillenia trifoliata*, Moench. ?—C. S. S.

Le 9 continué mes herborisations : *Abies canadensis*, *Abies nigra*? fol. undiq. sparsis : *Spirea* , . . , *Sp.* . . . *Pinus strobus*.

Le Dimanche 10 Aoust 1794 arrivé au pied de Black montain : *Podophyllum*?* floribus . . . baccis ceruleis : *Vaccin. coccineum* : *Fagus castanea americana* &c

Le 11 arrivé sur le coté . . . de Black Montain. *Abies nigra* ; *Diervilla* ; *Acer pensylvanicum* ; *Sedum foliis inferiorib. dentatis, superiorib. integris* ; *Sorbus aucuparia* ; † *Rubus odoratus* ; *Rhododendron maximum*, *Kalmia latifolia*, *Vaccin. stamineum, resinoseum* ; *Andromeda arborea, axillaris, racemosa* ; *Clethra montana* ; frutex *Azaleae facies* ; *Vitis* ‡ fol. inferne tomentosis, baccis magnis (fox grapes, fruit bon à manger)

Le 12 revenu de la montagne.

Le 13 arrivé à l'habitation du Sr Ainsworth.

Le 14 Brouillard épais et difficulté de parcourir les hautes montagnes, herborisé dans les Vallées.

Le 15 Pluye.

Le 16 voyagé vers la Montagne jaune et Roun§ mountain, arrivé sur Towe River|| Bright Settlement^{nt}. Les principaux habitans de cet Etablissement sont Davinport, Wiseman . . .

Herborisé : *Azalea coccinea, lutea, flava, alba et rosea* : toutes ces variétés de l'*Azalea nudiflora* se trouvent dans ce territoire ; *Vaccinium cranberry* affinité à l'*Oxicoccus* ; *Pinus Strobus*, *Abies Canadensis* &c &c. *Gaultheria procumbens* ; *Epigea repens*.

Le Dimanche 17 agréé avec un Chasseur¶ pour aller sur les Montagnes.

Le 18 herborisé et décrit plusi : plantes de la Syngenesie frustanée, *Hellanthus atrorubens*, *Rudbeckia* &c &c.

Le 19 parti pour aller vers les hautes montagnes.

Le 20 herborisé dans les Montagnes: *Acer pensylvanicum, canadense* &c.

Le 21 Aoust 1794 arrivé au sommet de Roun-mountain : reconnu en abondance un petit arbuste** à feuilles de Buis que j'avois désigné précédement *Ledum buxifolium*, mais dont la capsule est a trois loges et s'ouvre par le sommet : flores pedunculati, terminales, plurimi, (in mense Junio floret). Cal. profunde 5-partitus, laciniis angustis horizontales post efflorescentiam, approximatis : Petala 5 ovata seu obcordata, apice obtusa sub receptaculo inserta, plana, decidua, nivea ; Stam. decem, filam. longitudine corollæ, erecto-patentia, alba ; Antheræ subrotundæ, didymæ, versatiles, pallide rubræ ; Germen ovatum Stylus filiformis, longitudine

* This is probably his *Diphylleia cymosa* ; *Flora*, 1, 203, t. 19 and 20.—C. S. S.

† *Pyrus Americana*, D. C.—C. S. S.

‡ *Vitis Labrusca*, L.—C. S. S.

§ The now well known Roan Mountain.—C. S. S.

|| Toe River.—C. S. S.

¶ Davinport.

** *Leiophyllum buxifolium*, Ell. var. *prostratum*.—Gray. One of the common and most characteristic plants found on the summit of the Roan.—C. S. S.

statinum, Stigma obtusum; Capsula trilocularis . . . Frutex buxifolia, sempervirens . . .

Potentilla tridentata; Sorbus aucuparia: Pinus abies balsamifera &c.*

Le 22 arrivé au sommet de la Montagne Jaune Yellow mountain.

Le 23, Retourné à l'habitations de Davinport.

Le Dimanche 24 Aoust 1794, mis en ordre mes Collections.

Le 25 Pluye.

Le 26 parti pour Grand-Father mountain, Montagne la plus élevée de toutes celles qui forment la chaine des Alleghany et des Appalaches.†

Le 27 arrivé au pied de la plus haute montagne.

Le 28 Monté et arrivé jusqu'aux Rochers.

Le 29 continué mes herbor: parmi les Mousses diverses, les Pinus Abies balsamifera, Abies nigra, Acer pensylvanicum &c &c &c.

Le 30 Monté au sommet de la plus haute montagne de toute l'Am. Sept. et avec mon compagnon Guide, chanté l'hymne des Marseillois et crié Vivre l'Amérique et la Républiq. Francaise, Vive la Liberté &c &c.

Le Dimanche 31 Pluye toute la journée et resté au Camp.

Le Lundy 1^{er} Septembre 1794 revenu à l'habitation de mon guide Davin Port.

Le 2 Pluye et herborisé.

Le 3 rédigé mes Collections

Le 4 même travail.

Le 5 parti po. Table Mount.

Le 6 Visité les rochers de la Montagne Hock-bill et de Table Montagn. Ces montag. sont très steriles et l'Arbuste nouveau Ledum? buxifolium est la seule plante rare que s'y trouve. Il y est en abondance. Couché à 6 miles de distance chez . . . Park's.

Le Dimanche 7 parti pour Burke court house ou Morganton, couché chez le General Mac Douwal; vu aupres sa maison Spirea tomentosa en abondance.

De Burke chez John Wagely env. 13 M.

De John Wagely chez Th. Young . . .

De Thomes Young ch. Davin Port 8.

Le 8 Septembre arrivé à Burke court house ou Morganton; Visité le Col. Avery et couché chez lui.

Le 9 au solr parti de Morganton, couché à 3 M. de distance.

Rencontré un habitant de Stateboroug, M^r Atkinson qui m'a invité à aller chez lui.

Le 10 arrivé chez Robertson, 80 M. de Morganton.

* *Abies Fraseri*, Lindley. At the time of Michaux's visit the cones, if any were produced that year, were nearly fully grown, and it is remarkable that he did not notice their long exserted bracts and detect a different species. It is probable that misled by the general resemblance of this species with the Northern *A. balsamea*, that he did not critically examine the *Firs* which abound just below the summit. It is more remarkable that no mention is made in the Journal of the thickets of *Rhododendron Catawbiense*, which is nowhere else so fine and luxuriant as near the summit of the Roan.—C. S. S.

† No less than fifty peaks in the Alleghany system, including both the Roan and those of the Black Mountains, are now known to exceed the Grandfather in elevation.—C. S. S.

Le 11 venu coucher chez Reinhart Lincoln court house 15 M. de Robertson.

Le 12 parti pour Yadkin River et Salisbury : couché à Catawba Spring 18 miles de Lincoln.

Le 13 passé à Betty's ford sur Catawba riv. 20 M. de Lincoln. *Planta annua, ramosa, ramis oppositis, erectis, subtetragonis*; fol. ovata 3-nervia subsessilia : Peduncula axillares uniflori : Cal. 5-partitis basi calyculatus sq. duabus, foliolis calycinis ovalis, acuminatis, suberectis ; Corolla tubulosa, tub. cylindricus, longitudine calycis, Limbus irregularis 5-partitus, laciniis ovatis duab. superiorib. rectis : Stam. 4 didynamiae, filamenta longitudine corollae, filiformia ; Antherae subrotundae ; Germ. tetragonum, Styl. filiformis, longitud. staminum : Stigma 2-fidum, lacineae aequales : Semina 4 in fundo calycis, ovata, rugosa. *Planta annua in mense Julii August floret : Flores cerulei, filam. et pistillum cerulei (Antherae hyacintha colore)* Habitat in remotis Virginiae, Carolinae-Sept. in locis saxosis.†*

Couché dans une ferme à 8 M. avant d'arriver à Salisbury ou est la jonction et le point de reunion des trois routes de Philadelphie de Charleston et de Kentucky.

Le Dimanche 14 passé par Salisbury, ville dont l'apparence est moins miserable que celles des autres villes de la Carol. Sept. dites C. house. 50 M. de Lincoln à Salisbury. Continué ma route pour Fayette ville. passé Yadkin river et couché à 14 Miles de Salsbury.

Le 15 passé plusieurs Creeks et *des Montagnes basses* mais très pierreuses.

Le 16 partie de la route très pierreuse. Vu le Magnol. acuminata florib. luteis : *Collinsonia tuberosa*, Ensuite entré dans un sol sablonneux : Couché chez Martin, Store Keeper.

Le 17 continué à travers les Collines sablonneuses.

Le 18 arrivé à 6 Miles de Fayette ville. Perdu mes deux Chevaux.

Le 19 et 20 employé ces deux jours à chercher mes chevaux.

Le Dimanche 21, trouvé l'un des deux et . . .

Le 22 arrivé de nouveau à Fayette ville, cy devant Cross-Creek. La Riv. Cap Fear passe auprès de cette ville. Vu dans mes herborisations des marécages qui environnent cette ville, *Cupressus disticha*, thyoides, souvent ensemble. *And. Wilmingtonia, Nymphaea hastata.‡*

Le Mardy, 23 Septembre 1794 parti de Fayette ville apres avoir eu la satisfaction de lire les Nouvelles arrivées de Philad* la veille concern^t les glorieux succès de la République. Couché chez le Vieux (?) Mac-Cay. 15 M. de Fayette ville sur la route de Salisbury.

Le 24 pris à main gauche la route de Charleston et passé Drowned Creek à Mac Lawchland bridge : Mais la route la plus direct de Fayetteville à Charleston est de venir à Widow Campbell Bridge 40 (?) Miles

* Verd d'eau.

† *Isoanthus caeruleus*, Michx.—C. S. S.

‡ *Nuphar sagittifolium*, Pursh. ?—C. S. S.

de Fayette. De Widow Campbell Bridge à Gum-swamp 10 Miles de la Ligne qui separe la Carol. Septentrionale de la Caroline Merid.

Le 25 passé par Gum-Swamp et couché à 8 Miles au de la de Fayetteville.

Vu le Cupressus thyoides et le Cupressus disticha en plusi. Swamps : Vu l'Andromeda Wilmingt. en abondance dans toutes les Swamps ; Liquidambar peregrinum &c. A 2 Miles de Gum Swamp l'on entre dans la Caroline Meridionale.

Le 26 passé par Long Bluff petit hameau situé à 2 Miles au Sud de la riv. Big Pedée 74 M. de Fayetteville.

Le 27 passé par Black-Swamp, 22 M. de Long Bluff.

Colon. Benton. 13 M. de L. Bluff.

Black Creek 10 M. de L. Bl.

Jefferis Creek 10 M. de L. Bl.

Le Dimanche 28 passé par Lynch's Creek. 40 M. de L. Bl.

Le 29 passé par Black river 30 M. de Lynch Creek. Le nomme Lorry tient le ferry de Black river.

Le 30 arrivé à Maurice ferry sur la Riv. Santee 15 Miles de Black riv. et 20 M. de Monk's corner.

Le passage du ferry étoit dangereux et je fus obligé d'aller à Lenoue ferry. Il y a 25 M. de Maurice ferry à Lenoue ou Lenew's ferry.

Le 1^{er} Octobre 1794 parti de Lenew's ferry et passé par Strawberry's ferry 25 M. de Lenew's ferry et 28 M. de Charleston : Arrivé à l'habitat. près Ten-M. house.

Le 2 parti pour Charleston.

Occupé jusque vers la fin de Novembre à recueillir les Plantes d'Autonne. Vers le 10 Octobre la fièvre du climat s'est emparé de moi. Je l'ay gardé environ douze jours et j'ay été plus de six semaines à bien me retablir. Travaillé tant à reparer le Jardin qu' à mettre en ordre mes Collections de Plantes jusqu' à la fin de Decemb.

Le 30 Germinal l'an 3^e de lu Republique française Une et Indivisible (Dimanche 19 Avril 1795 vieux style) parti pour aller herboriser dans les hautes Montagnes des Carolines et pour visiter ensuite les Pays de l'Ouest (Western territories). Plantes vues avant d'arriver à Monk's corner : Heuchera . . . , Vicia 2 espèces, Smilax herbacea erecta, Melampodium? . . . Polyg. necess. Silene Virginica, Phlox lanceolata alors en fleur, Valeriana. Couché à 45 M. House.

Le 10 Floreal, (20 Avril,) environ de quarante cinq Mile house, Valeriana ; 3 Miles avant Neilson's ferry Gnaphallum diolcum, Uvularia? . . . Led. 20 Avril, arbre nouveau de la riv. Santee à feuille d'orme fructus muricati capsula muricata, semen unicum, subovatum.*

Ces graines étoient alors presq. mures ; Celtis occidentalis fleurs . . . † et fl. mâles inferieures.

Couché à 77 M. de Ch.

* *Planera aquatica*, Gmel. (*P. Gmelini*, Michx.)—C. 8. 8.

† A word here is illegible in the manuscript.—C. 8. 8.

Le 21 Avril remarqué sur High-hills Santee ; Phlox à fleurs blanches et Phlox à fl. roses, deux espèces différentes, très petit Phlox à feuilles lancéolées ; Vu aux envi. de Monk's corner Lupinus hirsutus en fl. Diné chez D^r . . . ; couché à Statesboroug.

Le 22 passé par Cambden, cinq miles au de la Kalmia nouveau, il n'était pas encore en fl. Couché à 10 M. au de la Cambden.

Le 23 Av. passé par Flat rock, par Hanging rock Creek et couché à Cane Creek, Lancaster county chez le nommé M^r May ; pendant la nuit mon cheval s'échappa, en suivant les traces, on vit qu'il avoit passé chez . . . Lee Esq.

Le 24 je fus obligé de le chercher toute la journée. M^r Lee envoya son fils et son nègre aussi po. le chercher. Il me fit procurer un Cheval po. aller, après il m'invita à venir loger chez lui ; il me combla de civilités.

Le 25, le cheval vint de lui-même à la maison de M^r Lee : Plantes sur le Creek ; Dodecatheon Meadia, Asarum Canadense, Claytonia Virginica, Erythronium dens-leonis.

Le Dimanche 26 Avril, parti de Cane Creek, passé par Land'sford sur Catawba river. Mais la vray route est de Cane Creek demander la maison ou Plant. de Col. Crawford sur Waxsaw, ensuite passer MacClean Hands ferry sur Catawba ; De là, droit à Iron works dit Hills Iron Works, exploités par le Colon. hill.

Ainsi de Cane Creek à Waxsaw . . . Miles : De Waxsaw à Iron Works, York county . . .

Le 27 passé Iron Works environ 32 miles de Cane Creek.

Le 28 passé par Armstrong ford sur la branche meridionale de Catawba, 12 miles de Iron Work.

Le dit. jo. passé par l'habitation de Bennet Smith sur laquelle il y a un . . . Magnolia 12 Miles d'Armstrong ford.

Le 29 passé par Lincoln 12 Miles de Bennet Smith et 36 miles de Iron Work.

Le Jeudi 30 Avril passé par l'habitation du Bon homme Wilson, 9 M. de Lincoln et 6 M. de Robertson : 15 M. de Lincoln chez Robertson ; Arrivé à Morganton 30 M. de Robertson.

Le 1^{er} May passé la journée à Morganton et herborisé aux environs.

Le 2 passé la journée chez le Colonel Avery, 4 miles de Morganton.

Le Dimanche 3 May parti po. les Montagnes, à la distance de 14 Miles de Burke on trouve la maison de Wagely.

Les Montagnes de Lineville au pied des quelles cette maison est située abondent en Magnolia auriculata. Ils étoient alors en fleur. De Wagely chez le Capt. Young, il y a 8 Miles.

Le 4 May parti de chez Young. Il y a 2 M. po. aller chez Ainswort, mais en prenant la main droite, l'on arrive au pied d'une très haute Montag. 3 M. de Young, le sommet est à 5 M. de chez Young.

Du sommet de la Montagne ch. Y Bright dit Bright Settlem^{nt} il y a

3 M. et de Bright, ch. Davin Port 2 Mil. en tout 10 M. de Young chez Davin Port.

Le 5 May herborisé aux environs des habitations de Davin-P. et de Wiseman.

Le 6 parti pour les Mont. scæv. Roun Mountain et Yellow Mountain ; Toe River coule entre ces Mountains. Tous les Convallaria étoient en fl. ainsi q. les Podophyll. diphyll. et umbellatum.

Le Dimanche 10 May 1795 revenu des Montagnes à l'habitat. de Davin Port.

Le 11 herborisé sur les Montagnes en face de l'habit. Il y a environ 3 Miles pour aller au sommet des Bleue Ridges sur la partie nommée Rompback ; sur les premières Montagnes l'on voit en très grande abondance l'Azalea fol. apice glandulosis ; Azalea lutea. Il n'y a pas d'autres Azalea sur les Collines qui environnent les habitations des nommés Davin Port et Wiseman que cette espèce à fl. jaune. Celui qui borde les Rivières est communem^{nt} celui à fl. incarnates et celui à fl. blanches. *

Le 12 monté au sommet des Blueridges Rhododendrons minus en fleur, Cyripedium luteum.

Le 13 May parti pour continuer mon voyage. Arrivé à Midy au pied de Yellow Mountain 10 Miles. Le soir venu coucher chez John Miller 12 M. de la Montagnes. Ainsi il y a 22 Miles de Davin Port chez Miller ; à un $\frac{1}{2}$ mile l'on commence à traverser Doe River.

Le 14 cotoyé et traversé Doe river au nombre de 27 fois. Elle est dangereuse lorsque les eaux sont fortes. Couché chez le Colonel Tipton 20 Miles de chez Miller.

Le 15 passé par Johnsboroug 10 Miles de l'habitation du Col. Tipton et 84 Miles de Burke C. house. Couché chez Anthony Moore près Noley-chukey river. Pendant la nuit mon cheval s'est échappé.

Le 16, Dimanche 17, 18 employé à chercher mon cheval.

Le 19 acheté un autre cheval au prix de cinquante Doll. d'un habitant de Noley chukey, riv. nommé . . . Earnest voisin du nommé Andrew Fox. Le Magnolia tripetala abonde sur les rives de Noley Chukey.

Le mercredi 20 May, passé par Green Court house 27 Miles de John's Borough et la route pour le Kentuckey en prenant la main droite et passant par . . . ferry sur Holston river. En continuant tout droit, la route conduit à Knoxville. En prenant à gauche un peu avant Green, la route conduit à Frenchbroad. Il y a 27 M. de John Borough à Green Court house.

Le 21 passé par Bull's gap 18 M. de Green.

Le 22 passé par Iron Works 30 Miles de Bull's gap. Il n'y a que quatre Miles distance à la rivière dite Houlston riv. A deux miles de Iron Works, il y a un Rocher de mineral dont les morceaux étant broyés et mis en poudre donnent une teinture rouge au coton ; l'on fait bouillir ce mineral &c.

Le 23 mon cheval étant blessé, je fus obligé de séjourner à un Mille de

* *Rhododendron arborescens*, Torrey.—C. S. S.

Iron Works sur Mossy Creek chez le nommé Newman ; Près de sa maison, ($\frac{1}{2}$ mile) l'on trouve le mineral que je suppose etre de l'Antimoine.

Le Dimanche 24, arrivé chez le Colonel King sur Houlston riv. au lieu dit Macby ferry 15 Miles de Iron Work.

Le 25 passé le ferry et arrivé à Knoxville, 15 miles de Macby ferry, residence du Gouverneur des Western territories, 110 Miles de Johns borough. Plantes et Arbres du Territoire de Knoxville et des Territoies adjacents : *Quercus prinus saxosa* ; *Q. pr. humilis* ; *Q. rubra* ; *Q. proemorsa* ; *Q. tomentosa* ; *Q. pinnatifida* ; *Q. alba*. . . . *Ulmus viscosa* ; *Ulm. fungosa* ; *Fraxinus* *Diospiros Virginiana* ; *Liquidambar styracifl.* ; *Juglans nigra*, *alba seu oblonga*, *hiccory pignut*. *Platanus occidentalis* ; *Nyssa aquatica* ; *Fagus castanea americana* ; *Fag. pumila* ; *Fag. sylvatica americana* ; *Magnolia acuminata* ; *Betula alnus americanus* ; *Cercis Canadensis* ; *Cornus florida* ; *Evonimus latifolius*, *Evon. Americanus* ; *Podophyllum peltatum* ; *Jeffersonia* ; *Sanguinaria Canadensis* ; *Trillium sessile*.

Resté toute la semaine à Knoxville et herborisé aux environs en attendant une caravanne assés nombreuse pour passer les Wilderness.

Le Dimanche 31 May reçu avis de vingt cinq voyageurs armés sur le point d'arriver à Knoxville.

Le Lundy 1^{er} Juin 1795, vieux style, le voyage fut encore differé.

Le Jeudy 4 Juin parti de Knoxville et couché à 15 miles chez le captain Camel au lieu dit Camel station.

Le Vendredy 5, couché au lieu dit West Point sur Clinch river, Poste de soldats pour garder les frontières du territoire, 25 M. de Camel station.

Le 6 parti et traversé la rivière dans un Bacq ou ferry dependant de West Point station. Notre marche fut de 10 Miles. Le nombre des Voyageurs étoit de 15 hommes armés et plus de trente femmes et enfants.

Le Dimanche 7 Juin traversé les Montagnes dites Cumberland Mountains, 22 Miles.

Le 8 continué notre marche dans les Montagnes 23 Miles, *Magnolia petalis basi purpureis*.*

Le mardy 9 Juin 1795, monté et descendu alternativem^{nt} les Montagnes. Dans les fonds *Magnolia tripetala* en abondance, 25 Miles.

Le 10 arrivé sur Cumberland River, 10 Miles et couché au de la 20 Miles.

Le 11 arrivé à Blodsoe Lick ou Blodsoe station, 20 Miles. En totalité 120 Miles de Willderness.

Couché à cet endroit ou l'on trouve de quoi vivre pour les hommes et pour les Chevaux.

Le Vendredy 12, venu à un Mile chez le Colonel Winchester ; couché deux nuits pour me reposer et reposer mon Cheval.

Le Dimanche 14 herborisé.

Le 15 venu chez un habitant près la Rivière Cumberland M^{ter}. Jack-

* Probably *M. macrophylla*, Michx. In the *Flora* it is described as growing only "in regionibus occidentalibus fluvio Tennessee trajectis."—C. S. S.

son terrain fertile. Chênes, *Quercus prinus* : *Q. rubra*, *Q. glandibus magnis, capsulâ includentibus*, nommés Overcup White Oak.* *Q. tomentosa*, † *Q. præmorsa*. 25 Miles.

Le 16 arrivé à Nashville 12 Miles.

Total 197 Miles de Knoxville à Nashville, capitale des Etablissements de Cumberland située sur la riv. Cumberland.

Le 17 visité différentes personnes, Daniel Smith, Col. Robertson, Capt. Gordon, . . . Deaderick, Dr White, Th. Craighead, &c &c.

Les jours suivans herborisé.

Arbres du Territoire de Nashville ;

Quercus prinus ; *Q. phellos latifolia* ; *Q. pinnatifida* ; *Q. foliis lyratis subtus tomentosis calycibus maximis margine laciniatis glandib. includentibus* Vulgo ; Over cup White Oak ; ‡ *Q. rubra* ; *Q. tomentosa* ; *Acer saccharum*, *A. negundo*, *A. rubrum* ; *Jugl. nigra, oblonga, hiccory* ; *Platanus occidentalis* ; *Liquidamber styraciflua* ; *Ulmus viscosa fungosa* ; § *Carpinus Ostrya americana* ; *Rhamnus Alaternus latifolius*, *Rh. frangula* ¶ || frutex prunifer ; *Juniperus Virginiana*. Rives de Cumberland rivière Philadelph. ined. ; *Aristolochia siphonotoma* ; ¶¶ *Mimosa erecta-herbacea* ; *Mirabilis** clandestina seu umbellata seu parviflora* ; *Hypericum Kalmian-grandiflorum*. ††

Sol de Nashville argilleux, pierreux, Roches calcaires à peu près comme celui du Kentucky, situation des Roches horizontales, rarement des Veines de Quartz dans les Roches, abondantes en petrifications marines.

Le Dimanche 21 Juin 1795 tué et depouillé q. q. oiseaux.

Oiseaux : Robin, Cardinal, Tetrao, *Lanius Tyrannus* rare, Quantité du Genre *Muscicapa* : peu d'espèces du Genre *Picus* : Dindes sauvag. Quadrupedes : Rat musqué, Castor, Elk, Cerfs nains, Ours, Buffalos, Loups, Ecureuils petits gris.

Minéraux : sol argilleux. Roches calcaires touj. dans une situation horizontale ; Ardoises impures, schistus tabularis ; Petrifications de coquillages terrestres et des eaux douces.

Le lundy 22 Juin 1795 (V. st.) 4 de Messidor l'an 3^e de la Republ., parti de Nashville pour le Kentucky ; passé par Mansko's Lick, 13 miles de Nashville ; couché chez le Major Sharp. 29 M. de Nashville.

Le 23 traversé les Barren oaks et couché sur . . . Creek. Il n'y a aucune maison dans cet interval. Le Terrain ne prod. q. des chênes noirs 30 M.

Le 24 passé par Big Barren Riv : Celui qui tient le Ferry est bien fourni de provisions. Il y a 3 Miles de Creek . . .

* *Quercus macrocarpa*, Michx., here first mentioned.—C. S. S.

† *Q. bicolor*, Willd.—C. S. S.

‡ *Q. lyrata*, Nutt.—C. S. S.

§ *Ulmus fulva*, Michx.—C. S. S.

¶ *Rhamnus Caroliniana*, Gray.—C. S. S.

¶¶ *A. tomentosa*, Sims.—C. S. S.

** *Oxybaphus nyctagineus*, Sweet. (*Allomia nyctaginea*, Michx.) ?—C. S. S.

†† Probably *Hypericum aureum*, Bartram.—C. S. S.

Traversé les Barrens et couché sur terre sans feu et sans laisser pâtre mon chev. à l'écart de crainte des Sauv.

Le 25 passé par Little Barren Riv. prem. habitation 43 M. de Big Barren Riv. Passé ensuite par Green River 6 Miles de Little Barren River.

Le 26 passé par Roland fork, head of Salt River 30 Miles de Green Riv.

Le 27 arrivé à Danville 35 M. de Roland old fork.

Nashville à Danville la plus ancienne ville du Kentukey 117 Miles.

Le Dimanche 28 Juin reposé.

Le 29 dépouillé trois Ecureuils rayés (*Sciurus striatus*.)

Le 30 herborisé.

Le Mercredi 1^{er} Juillet 1795 visites chez plusieurs habitants.

Le 2 pluyé continuelle.

Le 3 mis en ordre mes anciennes Collections.

Le 4.

Le Dimanche 5 Juillet. *

Le Dimanche 12 Juillet diné chez le Gouverneur de l'Etat de Kentuckey Isaac Shelby.

Le jedy 16 Juillet 1795 party de Danville.

Le 17 passé par Beardston quarante trois Miles de Danv.

Le 18 arrivé chez Standford près Man's Lick.

Le Dimanche 19 resté pour attendre mon Baggage.

Le 20 resté, et étant obligé de séjourner, observé les Ouvrages concernant la fabrication du Sel. Les Puits pour tirer l'eau salée sont creusés à . . . pieds environ de profondeur. L'on trouve une argille bourbeuse jusqu'à . . . pieds de profondeur. Ensuite . . . pieds d'une roche d'ardoise. Lorsque l'on a percé la roche, on trouve l'eau salée de plus de . . . pieds de profondeur. Cette ardoise brule dans le feu comme si elle étoit impregnée de bitume ou entierement composée de cette substance. L'on a trouvé des ossements de ces grands corps marins qui sont assés fréquents sur les rives de l'Ohio, dans l'argille impure que l'on creusa pour arriver jusqu'a la roche d'ardoise.

Le 21 Juillet, arrivé à Louisville 40 M. de Beardstown.

Le 22 et le 23 sejourné et herborisé.

Le 24 retourné à Manslick 16 M. de Louisville.

Le 25 revenu à Louisv.

Le Dimanche 26 Juillet herborisé.

Plantes des environs de Louisville: *Quercus cerroides*, † *Q. rubra*; *Q. alba*; *Q. prinus*; *Liriodendron*; *Fagus castanea*, *F. sylv.*; *Rhus fol. alatis dioique*; *Hibiscus* ‡ *fol. hastatis calyce exteriore lacin. subulatis flore pallide roseo*; §

* A part of one leaf of the Journal is here left blank.—C. S. S.

† Probably some form of *Quercus alba*, Michx.—C. S. S.

‡ *Hibiscus militaris*, Cav. (*H. hastatus*, Michx.)—C. S. S.

§ Here follow to the end of this part of the Journal separate memoranda on loose sheets.—C. S. S.

Observat. sur les vignes d'Am. Lincoln, Carol. sept. *Vitis fol. tomentos baccis majorib.* : fructifie au commencement d'Aoust, est nommé *fox grapes*.*

2) *Vitis fol. tomentos baccis minoribus*, fructifie vers le 10 Septembre est nommé *Summer grape* est le meilleur de tous à manger et très bon si on le laisse entierement murir. †

3) *Vitis fol. glabris baccis majorib.* est aussi réputé bon à manger et à faire du vin, Muscadin grapes par les habitants, fructifie vers le 20 Sept. ‡

4) *Vitis fol. glabris reticulat* : *baccis minorib*, croit au long des ruisseaux et des rivières. Winter grapes. §

.

Supplement.—5) *Vitis fol. crenatis acuminatis glabris caule repente*, *Vitis repens*. seu *Vitis riparia*.

(A Charleston Juillet.

Sol. se lasse couche à 7^h env.

Aoust 5^h 15' . . . 6.45 à 6.30.

Septembre 5.45 . . . 6.15.)

CAHIER 9. 1795 ET 1796.

ANNÉE 1795.

Le Samedi premier Aoust préparé à partir pour les Wabash et les Illinois.

Le Dimanche 2 je fus invité à diner chez un français nommé La Cassagne résident à Louisville depuis plus de 15 Ans.

Arbres arbrisseaux et Plantes du territoire de Louisville

Liriodendron tulipifera; *Platanus occidentalis*; *Acer rubrum foliis infernae argenteis*; *Fagus sylvatica americana*; *Quercus rubra*, *Q. alba*, *Q. præmorsa*, *Q. prinus*, *Q. cerroides*; *Tilia americana*; *Juglans nigra*, *Jugl. alba*, *Jugl. hiccory*, (*Jugl. pacane* rare); *Gleditsia triacanthos*, *Guilandina dioica*.

Le Dimanche 9 Aoust 1795 parti de Louisville et couché à Clarksville à deux miles de Louisville sur la Rive opposée de l'Ohio.

Le 10 nous nous sommes mis en route et nous sommes arrivé au Post Vincennes situé sur la Rivière Wabash le Jeudy au soir 13 Aoust : La Distance est évaluée cent vingt cinq Miles : Nous avons traversé une

* *Vitis Labrusca*, L.—C. S. S.

† *Vitis gestivalis*, Michx.—C. S. S.

‡ *Vitis vulpina*, L.—C. S. S.

§ *Vitis cordifolia*, Michx.—C. S. S.

| It is not clear what Species are here referred to. *Q. præmorsa* is probably *Q. macrocarpa*, and *Q. cerroides* some form of *Q. alba*, although later in the Journal it is spoken of as an overcup oak.—C. S. S.

Rivière le jour de notre arrivée environ 20 miles avant d'arriver au Post Vincennes et quoique les Eaux fussent alors très basses, nous fûmes sur la point de faire un Radeau, car le Pays n'est point habité sur cette Route. C'est de tous les Voyages que j'aye fait en Amerique depuis 10 ans un des plus penibles par la multitude d'Arbres renversés par les ouragans, par les broussailles épaisses que l'on est obligé de traverser ; par la quantité de Tiques dont on est devoré &c.

Le 14, le 15 et le Dimanche 16 Aoust je fus obligé de me reposer, étant arrivé presque malade. Mon cheval en sautant pour passer sur le tronc d'un gros arbre renversé, tomba et me jeta à une grande distance et je fus pendant plusi. jours incommodé d'une blessure au bas de la Poitrine vers le coté gauche parce que la batterie de mon fusil avoit porté sur cette partie.

Le 17 je passay une partie de la journée à herboriser au long de la Rivière Wabash.

Je continuay mes herborisations les jours suivans.

Le 18 Aoust 1795.

Liste des Plantes remarquées aux Wabash.

No. 1^{er} *Verbena** *urticifolia* caule erecto, paniculis divaricatis, bracteis flore brevioribus, florib. albis.

No. 2. *Verbena†* . . . , caule erecto paniculis fastigiatis erectis, bracteis et calycib. pilosis, florib. purpureo-ceruleis.

No. 3. *Verbena‡* caule recto, paniculis rectis foliis ovatis, tomentosis, duplicato-serratis.

No. 4. *Verbena* . . .

No. 5. *Verbena§* caule repente, foliis pinnatifidis, bracteis longissimis.

Silphium perfoliatum, *S. connatum*, *S. laciniatum*, *S. grandifolium*, *S. trifoliatum*, *S. pinnatifidum*. *Andropogon muticum* ; *Holcus?* . . . : *Poa* . . . ; *Quercus cerroides* Chêne frisé Overcup White Oak ; *Quercus latifolia* Chêne à latte Ram's Oak ; *Quercus* . . . *Polygonum aviculare staminib.* 5, Styl. 3 : *Polyg. aviculare majus staminib.* 5, Styl. 3. *Trifolium?* *pentandrum majus* ; *Trifolium?* *pentandrum floribus purpureis* : *Sanicula* ¶ *marylandica* ou Racine a Becquel par les Français des Illinois et Sakintépouah par les Sauvages Pians : La racine en d coction est un souverain remede pour plusi. maladies et pour les maladies venerieuses inveterées.

Le Dimanche 23 Aoust 1795 parti de Post Vincennes situé sur la Rivière Wabash pour les Illinois sur le Mississippi, Nous avons fait 6 Miles et nous avons campé sur le bord d'une Petite Rivière. Je n'avois d'autre compagnie qu'un Sauvage et sa femme. J'avois loué le Sauvage po. dix Piastres et je lui promis deux Piastres de plus po. l'engager à porter sur son cheval tout mon baggage.

* *V. urticifolia*, L.—C. S. S.

† *V. hastata*, L. ?—C. S. S.

‡ *V. stricta*, Vent. (*V. ringens*, Michx.)—C. S. S.

§ *V. bracteosa*, Michx.—C. S. S.

¶ *Spigelia*. ?—C. S. S.

Le 24 nous avons fait environ 25 Miles ; le Sauvage étoit malade et il fut obligé de s'arrêter plus de trois heures avant le coucher du soleil.

Le 25 traversé plusieurs Prairies ; Remarqué une nouvelle espèce de *Gerardia*,* Tige communément simple, feuil. ovales opposées sessiles, fleurs axillaires fleurs purpurines.

Le 26 la Provision de viande fut consommée : le Sauvage s'arrêta de très bonne heure, voyant un endroit favorable à la chasse. D'ailleurs, il tomba sur les trois heures après midi une Pluie considérable. Une heure après avoir campé, le Sauvage revint chargé d'un jeune Ours et de deux cuisses d'un autre beaucoup plus vieux. L'on fit bouillir deux fois la marmite et nous avons eu de quoi nous rassasier. L'on fit rotir ce qui restoit.

Le 27 le Sauvage tua deux cerfs. L'on s'arrêta de très bonne heure pour faire sécher les Peaux et pour manger, car le Sauvage ainsi que la Sauvagesse mangeoient cinq repas par jour. Non obstant cela ils se regaloient de la mouelle des os qu'ils mangeoient toute crue. Car ne pouvant emporter la viande, ils se contentoient d'un morceau des reins de l'animal.

Le 28 Aoust 1795 autant je souhaitois voir du Gibier le 1^{er} et le 2 jour, autant je craignois alors d'en voir par la perte du temps. Je souhaitois d'autant plus d'avancer qu'il pleuvoit tous les jours. J'avois déjà été obligé de faire secher au feu, une fois mon bagage qui avoit été complètement mouillé particulièrement quatre livres de Botanique, Mineralogie que j'avois avec moi, n'ayant pas voulu les exposer au hasard de la Rivière, ayant envoyé par le Mississippi deux Malles, contenant Papier gris, Poudre, Plomb, Alum, Bôites à recueillir des Insectes et tous les objets nécessaires à faire des Collections de Plantes, d'Animaux, d'Insectes et de Minéraux.

Le Dimanche 30 Aoust arrivé au village de Kaskaskia, situé à deux miles du fleuve Mississippi et à un demi mile de la Rivière Kaskaskia. Il est peuplé par des anciens français sous le Gouvernement Americain. Le nombre des familles est d'environ quarante cinq. La situation en est agréable, mais le nombre des habitans est diminué, l'on n'y voit que des maisons en ruines et abandonnées, parce que les français des Illinois ayant toujours été élevés et habitués au commerce des Peleteries avec les sauvages sont devenus les plus paresseux et les plus ignorants de tous les hommes. Ils vivent et ils sont habillés la plupart en partie à la manière des Sauvages. Ils ne portent point de culotes, mais ils passent entre les cuisses une piece de drap d'environ un tiers d'aune qui est retenue devant et derrière au dessus des Reins avec une ceinture.

Le 31 Aoust herborisé.

Le Mardi premier Septembre, continué mes herborisations, ainsi que le 2, le 3 et le 4 dudit.

Le 5 parti pour le village dit la Prairie du Rocher éloigné de 15 miles de Kaskaskia : Passé par le village S^t Philippe, abandonné par les Fran-

* *G. auriculata*, Michx. — C. S. S.

çais et peuplé par trois familles d'Américains. Ce village est à 9 Miles de la Prairie du Rocher.

Le 6 arrivé a Kaskia situé pres du Mississipi à . . . Miles de la Prairie du Rocher.

Le 7 herborisé et visité les environs de Kaskia.

Le 8 parti pour revenir à Kaskaskia et arrivé le 9.

Le 10 continué mes herborisations aux environs du Village Kaskaskia jusqu' au 13 dudit.

Le Dimanche 13 Septembre passé avec un guide sauvage sur la rive meridionale de la Riv. Kaskaskia et continué à herboriser sur cette partie jusqu' au 18 dudit.

Le 18 et 19 Pluyes continuelles. Mis en ordre mes Collections et reposé mon cheval.

Le Dimanche 20 . . .

Kaskaskia 45 familles. Prairie du Rocher 23 à 24 famill.—S^{ur} Phillippe 3 famill. Americains.—Fort de Chartres en ruines.—Kaskias 120 familles.—Americains à la Corne de Cerf et à Bellefontaine 35 famill.—S^{ur} Louis florissant Pet. cotes.

Le Vendredy 2 Octobre parti pour aller par terre vers l'embouchure de l'Ohio dans le Mississipi ; par la difficulté de passer la riv. Kaskaskia nous avons marché seulement 12 Miles.

Le 3 et le Dim. 4 Pluyes et nous avons traversé plusieurs prairies ; marché environ 27 M.

Le 5 passé encore les Prairies entrecoupées de lisières de Bois. Mon guide tua un Elk nommé par les Canadiens et par les français—Illinois Cerf. Cet animal est beaucoup plus gros (deux fois plus gros) que le Cerf nain des Etats-Unis qui abonde aussi aux Illinois et que les français de ces contrées nomment Chevreuil. Son bois est le double plus gros que celui des Cerfs d'Europe. Il y a audessous de chacun des deux yeux une cavité qui se tient refermée, mais en écartant les deux espèce de paupieres l'on peut enfoncer le doigt un pouce avant. Cette cavité paroît destinée à la secretion de q.q. humeur. En effet, ayant ouvert cette cavité, j'y trouvay une matière de la forme et de la consistance d'une crote des Lievres ; mais de la grosseur d'un gland de chêne. Cet animal a des dents canines en haut et en bas comme celles des chevaux nommées crochets. Les chasseurs disent q. cet animal est touj. très gras. En effet celui-ci l'étoit excessivement. Marché environ 32 M.

Le 6 entré dans les forets et traversé plusieurs rivièrres. Marché . . . miles.

Le 7 Octobre 1795 mon guide tua un Bufile qu'il jugea avoir environ quatre ans. Il paroissoit peser plus de neuf cens livres. Comme il n'étoit pas bien gras, mon guide me dit qu'il étoit très ordinaire à cet âge d'en voir de plus de douze cens livres. Il paroissoit plus gros qu'aucun des Boeufs de France et les surpasser en longueur et en grosseur.

Le Jeudy 8 Vu un autre Bufile à trente toises de notre Chemin. Nous nous arrêrames pour le considerer. Il marcha très lentem^t mais après

deux minutes il s'arrêta et nous ayant reconnu, il courut av. une vitesse extraordinaire : Arrivé ce même jour au Fort Cheroquis autrement nommé par les américains Fort Massac 125 Miles.

Le 9 Octobre 1795 herborisé au long du Mississipi ; *Platanus*, *Liquidamb.* *Bonducs*, *Noyers pacanes* et *Noyers hiccory*, par les français *Noyers durs* : *Noyers piquants* (par les français *Noyer amer.*) *Noyers à noix rondes*. *Chêne blanc*, *Quercus alba*, *Q. rubra ramosissim.*—*Q. cerroides* (par les fr. *chêne frisé* et par les Am. *overcup White Oak.*) *Q. prinus*, *Quercus integrifolia** seu *Q. foliis junioribus omnibus et adultis semper integerimis margine undulatis apice setaceis.* Cette espèce de chêne abonde au Pays des Illinois. Il perd ses feuilles plus tard q. les autr. especes de Chêne. Les habitans français le nomment Chêne à lattes. Dans la Basse Caroline il est assés rare mais il y garde ses feuilles jusqu' au mois de Fevrier et Mars. Il paroît se rapprocher du Chêne verd dont il differe par la forme de ses glands.

Nyssa montana assés rare ; *Gleditsia triacanthos* ; *Robinia pseudoacacia* (par les français *fevier.*) Le *Gl. triacanthos* est nommé *fev. épineux* et le *Guilandina dioica* Gros *fevier* et les graines *Gourganes* ; *Nota.* Il y a dans la riv. des Illinois, une esp. ou variété de *Guilandina dioica* dont les graines ont plus du double de grosseur de celles des Rives du Mississipi, du Cumberland &c. *Lianne Rajanioides* ; *Anonymos† ligustroides* ; *Vitis‡ monosperma*, cette espèce se trouve au long des Rivières et nullement dans l'intérieur des bois ; je l'ay vu sur la Rivière *Kaskaskia*, sur le Mississipi aux environs du fort Massac, sur la rivière *Tenasse*, mais elle couvre entierement les rives de la riv. Cumberland depuis son embouchure jusqu' à la distance de 45 M.

Le Dimanche 11 Octobre 1795 parti avec un Guide pour aller en Canot remonter la rivière (Shavanon) Cumberland. La pluye nous obligea de revenir.

Le Mardy 13 engagé deux hommes à une piastre par jour chacun pour remonter les Rivières du Territoire des Sauvages Cheroquis : Parti du fort Cheroquis, dit Fort Massac. La distance est six Miles po. arriver à l'embouchure de la Rivière *Tenasse* par les Français. *Illin. Rivière Cheroquis.* Cette riv. est très grande et très large. Apres avoir remonté environ six miles, ayant vu des traces d'Ours sur les bords, nous nous arrêrames et en entrant dans le bois il se présenta une Ours femelle av. trois jeunes. Le chien poursuivit la Mere et les jeunes ayant grimpé sur un arbre j'en tuay un et les guides tuèrent les deux autres. Nous passames la nuit en cet endroit. Le 14 Brouillard très épais, nous n'avons marché que 5 Miles. La Pluye survint vers midy.

Le 16 nagé ou ramé environ dix M. à cause d'un Vent très considérable

* *Q. imbricaria*, Michx.—C. S. S.

† *Pteris acuminata*, Poir. (*Adelia acuminata*, Michx.)

‡ *Vitis riparia*, Michx., or, more probably, in part, at least, *V. palmata*, Vahl. (*V. rubra*, Michx. in herb.), a species which is often monospermous, and which was discovered by Michaux in this region and merged by him with his *V. riparia*.—C. S. S.

qui avoit commencé par une tempête la nuit précédente et qui continua une partie de la journée. Nous avons campé vis à vis une Isle ou Chaine de Rochers qui traverse la Rivière presque entierement. Il y a cependant un courant sur le bord de la Rive méridionale assés profond, suffisant pour le passage de gros batteaux

Rives de la rivière Cheroquis (Tennessee) : *Platanus* : *Juglans pacana*, *Hiccori*, *pignut* ; *Liquidambar* ; *Quercus rubra*, *prinus* ; *Anonymos carpinoides* ; *Anonymos ligustroides* ;* *Betula australis* Bouleau† à écorce grise qui se trouve dans toute l'Ameriq. depuis la Virginie jusque dans les Florides ; il differe du *Betula papyrifera* ; *Bignonia catalpa* : *Ulmus* ; *Fraxinus* ; *Vitis rubra seu monosperma* ; *Gleditsia triacanthos* : *Diospiros* ; *Smilax pseudochina* ; *Bignonia crucigera*, *radicans* ; *Rajania* . . . *Dioecia 8-dria* : *Populus Caroliniana*, par les Franç. Creoles Liard et par les Americains Coton tree. (Nota : Le Peuplier du Canada est nommé par les Canadiens Tremble et par les Anglais du Canada Quaking Aspen.) : *Acer rubrum*, *saccharinum*, *negundo* : *Anonymos ligustroides* ; *Anonym. ulmoides*. †

(Le 22 Juin 1795. selon la Gazette Agents de la Republique française reconnus par le Président Washington.

Philip Joseph Letombe Consul Gen^l

Theod. Charles Mozard, Cons. à Boston.

Jean Anth. Bern Rosier C. à N. York.

Leon Delaunay Pennsylvania

Louis Etienne Duhait Maryland.)

Le 15 Octobre 1795 herborisé.

Le 16 descendu la rivière et campé à l'embouchure de la Rivière Shavanon dit Cumberland river par les Americains à dix huit Miles du Fort Massac ; tué un Oie du Canada nommée par les franç. Canadiens et Illinois Outarde ; tué deux Poules d'eau, un Martin pêcheur d'Amerique, un Pelican d'am.

Le 17 remonté environ dix Miles dans la Rivière, les bords étoient tres fréquentés par les Dindes sauvages ; les Rameurs et moi nous en tuames cinq en passant et de notre Canot sans descendre à terre.

Le 18 continué notre course vers le haut de la Rivi.

Le 19 descendu la rivière.

Le Mardy 20 Octobre 1795 revenu au Fort Cheroquis dit Fort Massac.

Arbres et Plantes aux environs sur les Rives de l'Ohio.

Platanus occidentalis par les Americains Sycamore, et par les français-Illinois cotonnier ; *Populus* par les Am. Coton tree et par les français-Illinois Liard : *Celtis occid.* par les Am. Hackberry tree et par les français. Bois inconnu ; *Liquidambar styraciflua* par les français de la Louisiane Copalm et par les Am. . . .

Un français qui commerçoit chez les Sauvages Cheroquis s'est gueri de

* *Forestiera ligustrina*, Polr. (*Adelia ligustrina*, Michx.).—C. S. S.

† *Betula nigra*. L. (*B. lanulosa*, Michx.).—C. S. S.

‡ *Planera aquatica*, Gmel.—C. S. S.

la Galle en buvant pendant dix jours la décoction des Copeaux de cet arbre qu'il nommoit Copalm et qui est le vrai Liquidambar: *Gleditsia triacanthos*, fevier par les franç. et sweet locust par les am;

Guilandina dioica ;*

Le Dimanche 25 Octobre 1795 *Spiræa trifoliata* est un purgatif usité par les Sauvag. et par les français- Illinois. Ils le nomment Papiconah. Aux environs du Fort Cheroquis, l'on trouve aussi le *Geranium* dit herbe ou plutot Racine à Becquet que l'on donne pour les Maladies chroniques pendant plusi. semaines; l'on y ajoute souvent la *Veronica virginica* qui est nommée par les fr.: herbe à quatre feuilles.†

Le Dimanche premier Novembre je fus obligé de differer mon Départ, mon Cheval n'ayant point été trouvé.

Le Vendredy 6, mon Cheval fut ramené au Fort et je me preparay immédiatement a partir pour les Illinois. Parti le même jour et marché environ dix huit Miles.

Le 7 la Pluye commence des le matin et continua toute la journée: Resté campé sous un Rocher ou je m'étois arreté la veille avec mon Guide.

Le Dimanche 8 voyagé dans les bois et les Collines.

Le 9 même.

Le 10 arrivé vers le soir aux Prairies.

Le 11 traversé les Prairies.

Le 12 vers le soir Rentré de nouveau dans les Bois et couché à 7 Miles de la rivière Kaskaskia

Le 13 arrivé avant dejeuner à Kaskaskia environ 130 Miles du Fort Massac.

Le 13 Novembre je me suis reposé.

Le Dimanche 14 j'ay été à la chasse aux Oies de Canada.

Le 15 mis en ordre mes Collections de graines.

Le 16 même occupation.

Le 17 j'ay été à la Chasse

Le Jeudy 18 parti po. aller à la Prairie du Rocher.

Le 19 Chassé aux Canards.

Le 20 Chassé aux Oies.

Le Dimanche 22 fait des visites.

Le 23, 24, 25, 26, 27 et le 28 visité les Montagnes de Roche qui bordent le Pays habité; Opussums, Racoons, Oiseaux aquatiques &c.

Le Dimanche 29 Novemb. j'ay été au Village St Philippe, dit le Petit Village.

Le 30 visité le Fort de Chartres.

Le Mardy 1^{er} Décembre parti pour Kaskaskias et j'y ay resté.

Le 2 et 3 dud. Pris des arrangemens avec Richard pour aller par eau à Cumberland.

Le 4 revenu à la Prairie du Rocher.

* A blank of 5 days in the Journal occurs here.—C. S. S.

† There is here a second blank of 5 days.—C. S. S.

Le 5 je me suis préparé à partir. Embourré une Oie sauvage à tête blanche.

Le Dimanche 6 parti de nouv. pour Kaskaskias.

Le 7 il m'a été confirmé de nouv. que la 2^e Ecorce du *Celtis occidentalis* (nommée aux Illinois Bois connu et vers la N^e Orleans Bois inconnu,) est un excellent remède po. guérir la jaunisse, l'on y ajoute une poignée de racine ou des feuil. de *Smilax sarsaparilla*; l'on en fait usage pendant environ huit jo. en decoction.

Le 8 Decembre 1795. Les Français Creoles nomment l'espèce de *Smilax* qui se trouve aux Illinois, Squine. Il n'y croit q. cette seule espèce qui soit épineuse elle perd ses feuilles en Automne. L'autre espèce est herbacée et grimpanche.

Le 9 Décembre. La racine de Fagara en decoct. est un puissant remède pour guérir le mal de la Rate. Je ne doute pas que l'on ne puisse faire usage de celle de *Zanthoxylum clava-Herculi* pour les obstructions du foie et de la Rate.

Le 10: *Bignonia Catalpa*,* po. les Creoles-français Bois Shavanon; *Cercis canadensis*, Bois noir; *Liriodend. tulipifera*, Bois jaune; *Nyssa*, Olivier. Les ouvriers emploient pour faire des Roues des voitures le Bois du *Padus Virginiana*, po. jantes Orme, po. les Moyeux, et chêne blanc po. les Rays.

Le onze Décembre. Confirmé de nouveau que la racine de la *Veronica Virginiana* vulgairement Herbe à quatre feuil. en decoction pendant un mois est efficace pour la cure des Maladies veneriennes: L'on fait bouillir quatre ou cinq de ces racines. Comme cette boisson est purgative, l'on doit augmenter ou diminuer la force de cette Ptisane en y mettant plus ou moins de racine ou bien en la faisant bouillir plus ou moins selon l'effet que l'on éprouve. Il suffit que l'on éprouve pendant les 1^{eres} jours le ventre relâché et plus libre qu'à l'ordinaire: il n'est pas surprenant que le 1^{er} jour l'on ait 3 ou 4 selles.

J'ay été informé aux Illinois que MacKey Scotchman & Even Velsh sont partis vers la fin de Juillet 1795 de S^{nt} Louis po. remonter le Missouri sur une Barge à 4 rames. Ils sont aidés par une Société dont Ch. Morgan creole des Isles est le Syndic.

Le Décembre 1795.

Le Dimanche 13 j'ay fait les derniers préparatifs po. le voyage de Cumberland.

Le 14 parti pour Cumberland; passé à la Saline sur le territoire Espagnol; Remarqué *Tagetoides*: Appris la nouvelle de la paix entre la France et l'Espagne. Couché à six miles de la Saline. Remarqué sur les bords du fleuve Mississippi *Equisetum* que les français-creoles nomment Prêle; Cette Plante a ici près d'un pouce de circonférence et la tige 4 pieds de haut.

Le 15 passé par le Cap. S^t Côme au bas du quel le Mississipi forme un

* This, doubtless, is *C. speciosa*, Warder, the only indigenous species in this region.—C.S.S

angle ; l'on y pêche du Poisson en abondance ; il y a dix huit Miles de distance de Kaskaskia : Campé au Girardeau 17 lieues de Kaskaskia.

Le 16 continué pendant 6 heures ayant des Collines et des Roches sur les rives du fleuve, ensuite des terres basses. Nous sommes venus camper à l'embouchure de la Belle Rivière dans le Mississipi. Sur la rive opposée, étoit campé le Gouverneur Don Gayoso, Gouv. des Natchez et de la haute Louisiane. Il envoya un Bateau pour sçavoir qui nous étions et ayant appris que j'étois passager, il vint me voir. Il m'annonça la nouv^e de la Paix entre la France et l'Espagne. Il me fit offre de ses services. Il y a dix huit lieues du Cap. Girardeau à l'Embouchure de la Belle Rivière et en tout 35 lieues des Illinois.

Le 17 campé à environ 7 lieues de distance.

Le 18 arrivé auprès du Fort Massac ; sept lieues.

Le 19 campé vis-à-vis le Confluent de la Riv. Cheroquis dit Tenasse.

Le Dimanche 20 passé par la Pacanière ; c'est un Marais considérable sur la coté Nord Ouest bordé de Noyers Pacanes, situé vis à vis ou plutot un peu avant d'entrer dans la Riv. Cumberland.

Le dit jour Dimanche 20 Décembre, entré dans la Rivière Shavanon dite Cumberland River dont l'Embouchure est à six grandes lieues du Fort Massac : Couché deux lieues au dessus de l'Embouchure.

Le 21 navigué environ 8 lieues.

Le 22 navigué environ 7 lieues et nous sommes venu coucher au grand Remoult dont le distance est évaluée à quarante cinq miles de l'embouchure.

Le 23 nous sommes venu camp. audessus de l'Isle aux Saules : navigué environ 12 Miles ou 4 lieues.

Le 24 resté campé ; Pluye toute la journée. La Rivière, dont la navigation avoit été tres facile jusqu' à ce jour, augmenta considerablement et se repandit dans les bois.

Le 25 la Pluye continua et fut mêlée de grêle : Resté au Camp.

Le 26 Resté campé à cause de l'augmentation de la rivière dont le courant toit trop rapide.

Le Dimanche 27 Décembre 1795. navigué environ 4 Miles seulement à cause de la difficulté de ramer contre le courant de la rivière ; Campé à l'embouchure de Little River.

Le 28 passé sur la rive opposée. Le courant qui étoit aussi rapide q. les jours precedens, nous força de camper : Gelée blanche.

Le 29 il survint de nouveau une Pluye considérable. Resté campé.

Le 30 la Rivière ayant débordé et submergé toutes les parties du bois, nous délogeames du camp et nous retournames à la petite rivière Little river ; nous remontames jusqu' à ce que nous trouvames une Colline assés haute po. ne pas craindre los débordements. Pluye.

Le 31 le temps devint clair, le vent passa au Nord, mais la rivière continua à déborder. La plupart allerent chasser aux Dindes sauvages.

Le Vendredy premier Janvier 1796. Vent du nord, Gelée ; Rivière augmentée d'un pouce pendant la nuit.

Sur les environs de Little river, Pays entremêlé de Collines : Sol argilleux, Terre végétale très riche, Roche de Silex très peu ferrugineuse. Pierre calcaire bleue.

Animaux : Racoons, Cerfs nains, Opossums, Bufles, Ours, Ecureuils gris, Castors, Loutres, Rats musqués (ces trois espèces très rares).

Oiseaux : Corbeaux ; Hibous de la grosse espèce, Cardinaux ; Geais bleux ; Peroquets verts à tête jaunatre de la petite espèce, Pies à tête et gorge rouges.

Arbres et Plantes : Liriodendron ; Liquidamb : Chêne chataignier, Chêne rouge ; Annona ; Charme-houblon.

Le 2 Janvier, toujours resté campé au même endroit. Temps couvert, la Riv. baissée de deux pouces seulement.

Le Dimanche 3 Grand vent : *Nyssa montana* est nommé par les Cr. franç. Olivier Sauvage et par les Americains Kentuckiens Black Gum tree et par les Americains Pensylvaniens Tupelo : N'ayant pas d'occupation, j'ay fait de l'encre avec des noix de galle que je recueillis sur les Chênes dans les environs du lieu ou nous étions campé ; celle-ci fut faite en moins de cinq minutes et me servira d'échantillon : Aux envir. de Little river, Liriodendron ; Liquidambar ; *Carpinus ostrya* ; *Ulmus fungosa* ; *Padus Virginiana minor*, *Laurus benzoïn* &c.

Le 4 navigué environ 4 à 5 M. Campé auprès de Collines assés hautes, d'un sol mouvant & cailloux roulés, *Carpinus ostrya* ; *Ulmus fungosa* ; *Padus Virginiana minor* ; *Philadelphus inodorus* ; *Nyssa montana* par les Am. Black gum ; *Acer rubrum* ; *Viscum parasite* ; *Fagus Americana* et *Orobanch. Virginiana* parasite sur les racines du *Fagus d'Ameriq.* ; *Betula spuria** par les Français Bouleau batard.

Le Mardy 5 Janvier 1796 nous avons navigué 7 Miles et campé vis à vis de Diev Island 12 M. de Little Riv.

Le 6 la neige tombée dans la nuit avoit refroidi le temps. Rochers calcaires escarpés ; en partant du lieu ou nous étions campés, qui étoient continués pendant un Mile environ sur la coté orientale : Navigué environ 8 Miles.

Le 7 La Rivière étoit diminuée de 19 pouces pendant la nuit, la gelée en diminuant les eaux, nous faisoit esperer plus de facilité à ramer contre le courant de cette rivière qui est naturellement resserrée entre des Collines. Navigué environ 8 Miles.

Le 8 la riv. avoit baissé pendant la nuit de 19 pouces. Passé par l'Isle de la ligne tirée entre Cumberland et le Kentucky.

Plantes des Rives : *Platanus occidentalis* ; *Betula australis* seu *spuria* ; *Acer rubrum* ; *Ulmus America.* ; *Fraxinus* ; *Salix* sur les Isles basses : *Anonymos ligustroid.* Navigué environ 10 M.

Le 9 la rivière avoit baissé pend^t la nuit de près de cinq pieds. Nous avons navigué environs dix Miles.

* *B. nigra*, L.—C. S. S.

Le Dimanche 10 Janvier la Rivière avoit baissé de 4 pieds pendant la nuit. Pluye et Neige continuelles ; Passé par la rivière jaune (Yellow Creek) 16 M. avant d'arriver à Clark's ville. Passé par Blowming grove ? 13 Miles avant d'arriver à Clark's ville. Passé par Blowming grove ? 13 Miles avant d'arriver à Clark's ville. Rochers et Collines. Passé par Dixon Island ? 10 Miles avant d'arriver à Clark's ville et actuellement l'Etablissement le plus reculé du territoire du Cumberland. Cet Etablissement est composé de quinze familles qui y sont venu s'établir depuis trois mois. Le chef lieu de cet établissement est nommé Blount's borough ou Blount's ville.

Le 11 Pluye pendant toute la nuit précédente et une partie de la journée. Passé par une chaîne de Collines et par un rocher nommé Red painted roc situé à la droite de la Riv. c-a-d. sur le coté septentrional de la riv. à 2 M. de Clark's ville. Passé ensuite par la riv. rouge dont l'embouchure est aussi sur le coté septentrional et à un quart de mile de Clark's ville : Enfin arrivé à Clark's ville.

Le 12 Janvier 1796, resté à Clark's ville à cause de l'augment de la riv.

Le 13 le Docteur Brown de la Caroline venu pour établir cette nouvelle ville Blount's borough à 10 M. au dessous de Clark's ville s'y trouva.

Le 15 acheté un cheval au prix de cent Dollars.

Le 16 parti ; mon cheval m'échappa et je le rattrappay à 6 Miles de Clark's ville au Moulin, 10 Miles.

Le Dimanche 17 diné à 10 Miles de Nashville chez Ebneston à $\frac{1}{4}$ de M. du Moulin chez un vieux Pensylv. homme instruit et au courant des nouvelles étrangères. Couché chez Crokes 18 Miles d'Ebneston. La V^e Martin demeure auprès de là et sa maison vaut mieux po. les voyageurs.

Le 18 passé les Ridges, 15 M. sans voir de maisons jusqu'à White Creek ; Le vieux Stump's demeure à 5 miles de White Creek.

Le 19 parti de chez Stump's et arrivé à Nashville 5 M.

Total de Clark's ville à Nashville 54 M. par terre et 70 M. par eau.

De S ^t Louis à Kaskaskias	94.
De Kaskaskias à l'embouchure de l'Ohio dans le Mississipi	95 Miles.
De la au fort Massac.	45 M.
De la à l'embouchure de la rivière Cum- berland	18 M.
De la à Clark's ville sur la riv. rouge	120 M.
De la à Nashville	60 M.
Total, 482 Miles cy	482.

(Prix (a Nashville) Diner 2^{sh}. Déjeuner ou souper 1^{sh}. 4^d. $\frac{1}{2}$ Pinte de

Whiskey 1^{re} Cheval po. foin et mays 2^{es}. Le tout est six Shillings po. un Dollar.)

Le 20, 21 et 22 sejourné à Nashv.

Le 23 parti de Nashville et voyagé 29 Miles $\frac{3}{4}$, logé chez le major Sharp.

Le Dimanche 24 Janvier 1796 arrivé à un Creek situé à 29 Miles près du quel le nommé Chapman tient logem^t à 3 M. $\frac{1}{4}$; Mac Faddin sur Big Brown tient ferry et logement : Total 32 M. $\frac{1}{4}$.

Le 25 Pluye et Neige.

Le 26 Parti po. Green river. La terre étoit couverte de neige; les Chemins rudes et mon cheval devint boiteux: Je fus obligé d'aller à pied: Je fis 12 miles. Il me fut impossible de faire du feu les arbres et les bois étoient tout en verglas; j'ay passé toute la nuit presque gelé. A peu vers les 2 heures la Lune étant levée je pris la parti de retourner chez Mac Faddin. J'y arrivay à 10 heures du matin.

Le 27 étant accablé de froid et de lassitude, ayant marché à pied, n'ayant pas mangé depuis la veille au matin et n'ayant pas dormi pendant la nuit, il me survint une inflammation aux doigts du pied droit. Je trempay mes pieds dans de l'eau froide, pendant toute la nuit suivante à plusi. reprises, et il n'en résulta pas de playes, mais pend^t plusi. jo. les doigts des pieds furent engourdis et comme privés de sensation.

Le 28 je fus obligé d'aller à sept Miles de distance po. faire ferrer mon cheval et je vins coucher chez M^r Maddisson qui avoit sa plantation tout auprès.

Le 29 Janvier 1796 je partis de très grand matin ayant 38 Miles à voyager sans trouver ni auberge ni autre habitation. J'avois été reçu avec toutes les civilités que l'on peut esperer d'un homme qui a reçu une éducation superieure à celle des habitans du pays. Mais ce M^r Maddisson étoit Virginien et parent du fameux Madisson Memb. du Congres. Celui ci étoit un vray Republicain dans ses principes et j'avois passé chez lui une soirée tres interessante et très agréable. Son epouse encherit à me procurer tous les services de l'hospitalité qui est très rare à rencontrer en Amerique, excepté chez les personnes d'une éducation sup. à celle du commun des habitans. Cette Dame me proposa de faire usage de chausson de laine grossière par dessus les souliers. Elle me tailla elle même une paire et je fus tellement surpris des avantages q. j'éprouvay les jo. suivans q. je resolut de ne plus voyager au tent des neiges et des gelées sans être précautionné d'une paire dans mon Porte Manteau. J'arrivay le soir à trois M. de Green riv. et couchay ch. un nommé Walter; je couchai sur le plancher et mon cheval à la belle étoile; mais j'y'ay étois accoutumé.

Le 30 je traversay au matin le ferry de Green river. Le froid fut excessif et tel que l'on n'en avoit pas éprouve de Plusieurs années. A 9 Miles, je passay par Bacon Creek à la Cabanne d'une homme nouvellem^t établi et dépourvu de tout, même de Mays po. l'entretien de sa maison. A 22 M. de Green Riv. l'on trouve la Maison d'un nommé Ragon: et je me hatay d'arriver avant la nuit à q. q. meilleures habitations. A 26 M.

de Green Riv. j'aperçus une Maison à 200 toises de la Route sit. sur le bord d'un Creek. L'habitant étoit un Allemand qui n'étoit établi q. depuis un an; il avoit une bonne écurie, il étoit bienourni de fourrage en paille de bled, et en feuilles de Mays po. mon ch. et je mangeai du pain de Bled po. la première fois q. j'étois parti des Illinois. Mon souper fut de pain et de lait et je me trouvay très bien traité. Mon hôte se nomme Geo. Cloes Allemand d'Origine; sa maison est située sur South fork de Nolin river.

Le Dimanche 31 passé par Huggins mill sur Nolin river (bon logement) à $\frac{1}{2}$ de Mile la route à droite va à Beardston. A 2 M. $\frac{1}{2}$ la new cut road est droite. Passé à 9 Miles par Rolling fork et 4 Miles plus loin couché chez M. Scoth sur Beech-fork.

Le Lundy 1^{er} fevrier 1796 passé par D^r Smith house 8 Miles de Beech fork et par Mackinsy 9 M. de Beech fork. De Mac Kinsy à Long lake 6 Mi. De Longlake à Sheperdston sur Salt river 4 miles. De Sheperdston chez Standeford 9 M. (bonne auberge) De Standeford chez Prince Old station 8 M. De Prince to Louisville 6 Miles.

Le 2 parti de chez Prince et arrivé à Louisville. Mesuré à 3 M. $\frac{1}{2}$ avant d'arriver un Liriodend. tulipifera sur la route à main gauche dont la grosseur est de vingt deux pieds de circonference de qui fait plus de sept pieds de diametre.

(Correspondant de M. La Cassagne et S^{mt} James Bauvais à la N. Orleans M^r Serpe Neg^t à la N. Orleans. Corresp. de M. La Cassagne à Philad. Gequir & Holmes Msm Ph^a Prix Diner 1^{sh}. 6^p. Souper et Dejeuner 1^{sh}. 6^p. Logement 9^{sh}. $\frac{1}{2}$ pinte de Brandy 2^{sh} 3^p Cheval par jo. au foin et mays 3^{sh}. 9^p.)

Le 3, 4 et 5 j'ay séjourné à Louisville, occupé à rassembler les Collections que j'avois déposés chez le nommé La Cassagne.

Le 6 je vis le Gen^t Clarke et il me fit part de la visite du Colonel Fulton qui étois venu de France q.ques mois auparavant.

Le Dimanche 7 déjeuné chez le Père du General Clarke dont la demeure est à 4 miles de Louisville. Je desirois avoir de plus amples informations concernant le Lieutenant Colonel Foulton. L'on me dit qu'il devoit se rendre à Philadelphie immédiatement après avoir passé en Georgie; Qu'il s'embarqueroit pour France et qu'il eseroit être de retour en Ameriq. à la fin de l'été le cette année 1796. Le même jour je partis po. retourner à Nashville. Couché chez Standeford. 14 M. de Louisville. (Souper 1^{sh}.; Coucher 6^p. Foin po. la nuit du chev. 1^{sh}. Mays 8 quarts 1^{sh}. 4^p.)

Le Lundy 8 fevrier 1796. (Déjeuner 1^{sh}.) Passé par Sheperdston 9 M. de Standeford. (Mays po. le cheval 3 quarts. 9 Pences Virginia monoye. comme dans tous les endroits du Kentuckey et de Cumberland.) Passé par Long lake ou l'on fait du Sel, ainsi qu'à Sheperdston, 4 Miles dud-Sheperdston et couché chez Mackinsy 7 Miles de Longlake.

Lieux marécageux, aux environs de Longlake Quercus alba; Q. cer-

roides ; Fraxinus . . . ; Nyssa ; Laurus benjoin ; Sassafras ; Mitchella repens ; Fagus sylvatica americana.

Collines : Pinus* fol. geminis conis oblongis minorib. squamis aculeis retrocurvis : Vu des planches de cet arbre chez un habitant ; le bois m'a paru presqu' aussi pesant que celui du Pin à trois feuilles de la Caroline : L'on en fait aussi du Gaudron dans cette partie du Kentucky.

Le 9 je suis parti de très bon matin de chez Mackinsy's, j'y avois été très bien reçu c. a. d. il me procura un souper de Porc bouilli ; même mets à déjeuner. Mon cheval fut très bien soigné en fourrage, en Mays et une Ecurie qui n'étoit pas bourbeuse, comme toutes celles de l'Amérique, quand on loga chez des Américains ou chez des Irlandais.

Je payai 3th. ce qui faisoit 1th. 6^{ps}. po. mon cheval et autant po. moi. J'avois payé 5th pour mon logem^{nt} de la nuit précédente et je n'avois pas été si satisfait : Comme la fille de cette maison étoit la plus active qu' aucune q. j'aye jamais vu en Ameriq. je lui donnai un quart de Piastre et le vieillard m'offrit une Langue fourrée, mais je le remerciay, n'étant pas partisan de viandes salées.

La pluye survint une heure après être parti et j'eus cependant le bonheur de passer Beechford et par Rollingford. 13 Miles de chez M. Kinsy.

Je fus obligé d'arrêter chez un habitant à un Mile $\frac{1}{2}$ du passage et la Pluye m'obligea d'y passer la nuit.

Il y a dans les environs du Liriodendron à bois jaune et dans quelques cantons du Liriod. à bois blanc. Les habitants estiment mieux celui à bois jaune.

Le mercredi 10 fevrier 1796, j'avois soupé la veille avec du Thé de l'arbrisseau nommé Spice wood. L'on fait bouillir une poignée du jeune bois ou des branches et après environ un quart d'heure au moins d'ébullition l'on y ajoute du sucre pour le boire comme l'on fait à l'égard du vray Thé. Il n'y avoit pas de Lait alors et l'on me dit que le Lait le rend beaucoup plus agréable. Cette boisson ranime les forces et produit cet effet, car j'étois arrivé très fatigué. Cet arbriss. est le Laurus Benjoin Linn : Les français des Illinois le nomment Poivrier et les chasseurs assaisonn^{nt} la viande avec qq. morceaux de son bois.

Il croit dans les environs une plante† de la famille des Orchis dont la feuille persiste tout l'hiver. Il y en a rarement deux ; la forme est ovale, sillonnée, entière ; la racine porte deux à trois bulbes très visqueuses. L'on s'en sert dans le Pays pour rejoindre la fayence cassée. Elle est nommée *Adam & Eve*. Cette plante est plus commune dans les riches bas fonds des terrains à l'Ouest des Montagnes Alleganies. Je l'ay vu aussi dans la basse Caroline mais elle y est très rare. Elle n'est pas rare aux Illinois.

La Pluye continua toute la journée et je fus obligé de passer la nuit dans une habit. aupres de Nolin Creek parce que les eaux étoient débordées.

Le 11 arrivé chez Huggins 12 M. de Rollingford.

* Probably *Pinus inops*, Ait.—C. S. S.

† *Aplectrum hyemale*, Nutt.—C. S. S.

Le 12 traversé un Pays d'herbages et de Chênes qui ayant été brûlés tous les ans, n'existent plus en forme de forêts. On appelle ces terrains Barrenlands, quoiqu'ils ne soient pas vraiment steriles. Les gramens y dominant ; le *Salix pumila*, les *Quercus nigra* et *Q. alba* dit Mountain White Oak. Le *Gnaphalium dioicum* y croit aussi abondamment. Il est nommé par les Am. White Plantain.

Ce même jour 12 fevrier 1796 passé par Bacon Creek ; lieu nouvellement établi 19 M. de Huggins Mill et arrivé à Green river 9 Miles de Bacon Creek. Couché 3 M. plus loin chez un nommé Walter.

Le 13 fevrier voyagé 37 Mil. sans trouver de Maison au trav. les terrains dit Barren lands. Le *Salix pumila* qui y abonde est le même que celui qui est très commun dans les prairies des Illinois en partant du Poste Vincennes po. aller à Kaskaskia. Couché au de là de Big Barren river.

Le Dimanche 14 voyagé env. 30 M. Dans toutes les Maisons, les enfants étoient attaqués de la Coqueluche que l'on nomme ici Hooping Cough. Cette maladie provient naturellem^t par un simple Rhume : mais le mauvais regime de vivre habituellement de viandes salées et fumées qu'ils font frire dans la poêle produit cette acrimonie d'humeurs qui rend l'expectoration plus difficile.

Le 15 voyagé 27 M. et arrivé à Nashville. Souper coucher, dej. 2^{sh}.

Le 16 parti pour aller visiter le Colonel Hays riche habitant auquel j'avois été récommandé par le Gouverneur Blount l'année précédente Gouverneur du Pays sous la denomination de Western territories South ouest of the Ohio. Le Pays estimé contenir 60 Milles habitans à cause des nombreuses émigrations annuelles et de la population rapide, venoit d'être érigé en un Etat gouverné par ses propres représentans sous la nouvelle dénomination de *l'Etat de Tennessee* du nom d'une très grande riv. qui traverse tout le Pays du Houlston, le Pays de Cumberland, le Pays des Indiens Cheroquis et d'autres contrées adjacentes. Cette grande rivière a son embouchure dans l'Ohio à 9 Miles au dessus du fort Massac. Elle a été connue par les Français qui les premiers ont decouvert les Pays de l'interieur de l'Am. Sept sous le nom de Riv. Cheroquis et elle est ainsi désignée dans les Cartes francaises. Je vis chez le Col. Hays plusi. habitans du voisinage qui venoient conférer sur les affaires courantes alors po. l'élection de nouveaux Officiers civils et militaires.

Le 17 et 18 fev. 1796 resté chez le Col. Hays à cause du mauvais temps.

Le 19 terminé le marché pour l'acquisition d'un Cheval pour transporter le baggage, les Collections des Plantes, Oiseaux et autres Objets que j'avois rapportés des Illinois et dernierem^t du Kentuckey ; Revenu le meme jo. coucher à Nashville.

Le 20 occupé toute la journée à réunir et emballer mes collections ; Vu des voyageurs français qui toute leur vies sont occupés au Commerce des Sauvages et demandé les Conditions po. avoir un Guide pour remonter la riv. Missouri. L'un d'eux nommé . . . me dit qu'il s'engageroit

volontiers p. un an au prix de 500 piast. en pelteries c.a.d. 1000 p. en arg^t : un autre me demanda 2000 en arg^t

Le Dimanche 21 préparé à mon voyage.

Le 22 j'ay fait ferrer mes deux chevaux.

Le 23 parti et après avoir fait 2 Miles obligé de revenir à cause . . .

Le 25 parti pour retourner en Caroline et couché à 10 M. chez le Col. Mansko, ennemi déclaré des Français parcequ'ils ont tué, disoit il, leur Roy ; quoique je n'eusse pas diné, je ne voulus pas accepter son souper croyant qu'un Republicain ne doit pas avoir d'obligations à un partisan fanatique, de la Royauté. J'étois très mortifié que la nuit et la pluye m'obligéassent de rester dans sa Maison. Mais je couchay sur ma peau de Cerf et je payai pour le Mays qu'il me fournit po. passer les Wilderness.

Le 26 . . .

Le Dimanche 28 fevrier 1796 sejourné à dix miles de la riv. à cause de la Pluye et parceque les Creeks étoient débordés.

Le 29 au soir passé les Creeks et couché dans le Bois pres de la route sur un endroit abondant en Roseaux ou Canes. Cette espèce de gramen qui abonde en plusieurs endroits qui n'ont pas été établi, se détruit lorsqu'il est brouté entierement par les Bestiaux ; les Cochons le detruisent aussi en fouillant la terre et en brisant les racines. La grosseur de la tige est quelquefois d'un tube de plume d'oie ; mais dans les riches terrains qui bordent les rivièrres et entre les montagnes il y a des tiges qui ont jusqu'à 2 et même trois pouces de diametre ; la hauteur est q.q. fois de 25 à 30 pieds. Ce gramen est rameux mais il fructifie rarement dans le territoire du Kentuckey, celui de Tenesse et dans les Carolines. La partie meridionale et maritime de la Virginie est le commencement de ce gramen. Plus en avance vers le Sud comme dans les Carolines dans les Florides et vers la Basse Louisiane, l'on trouve ce gramen en abondance.*

Il tomba de la neige toute la nuit et le lendemain matin, mes deux Chevaux qui avoient été attachés, avoient les jambes enflées à cause du froid et des chemins continuellement bourbeux par ou j'avois voyagé les jours précédents.

Le 1^{er} Mars 1796 arrivé au Fort Blount situé sur la Rivière Cumberland : La neige continua une partie de la journée.

Le 2 sejourné afin d'arracher des jeunes Plants d'un Sophora nouveau † q. j'avois remarqué aux environs de Fleen's creek à 12 M. à peu près du Fort. La neige couvroit la terre et je ne pus avoir des jeunes Plants, mais le Capit. William, le jeune qui residoit au Fort coupa quelques arbres et je trouvay q. ques bonnes graines.

* *Arundinaria macrosperma*, Michx.—C. S. S.

† *Cladrastis tinctoria* Raf., discovered here by Michaux, although not included in his *Flora*. A letter written by Michaux to Governor Blount suggesting the value of the wood of this tree as a dye wood, was, according to the younger Michaux, published in the *Knoxville Gazette*, on the 15th of March, 1796. (F. A. Michaux, *Voyage a l'Ouest des Monts Alleghans*, p. 255.)—C. S. S.

J'arrachay aussi des racines de ces arbres afin de les replanter dans mon jardin en Caroline.

Le même jour j'eus occasion d'écrire au Gouverneur Blount.

Le 3 Mars continué mon voyage, traversé plusi-fois Fleen's Creek : Vu de nouveau le petit ombillifere bulbeux que j'avois remarq. q. q. jours auparavant. Vers le soir la route s'est trouvée moins bourbeuse.

Le 4 arrivé aux Montagnes dites Cumberland mountains.

Le 5 passé plusieurs Creeks et Rivières sur les quelles abonde une Fougère grimpante du genre*

Le terrain traversé par ces rivières est moins fertile que dans le territoire de Nashville dit Cumberland settlement et les Pins à deux feuilles s'y trouvent abondamment.

Le Dimanche 6 Mars 1796 arrivé à West Point sur la Rivière Clinch.

Le 7 couché à 15 Miles de distance près la junction de la rivière Holston et de celle dite Tennessee.

Le 8 arrivé à Knoxville.

Le 9 Diné chez le Gouverneur Will^m Blount.

Le 10 pris mon logement chez le Captⁿ Louné près la rivière Cumberland.

Le 11 herborisé sur la rive opposée bordée de rochers escarpés couverts de Saxifrage, Umbellifere bulbeux &c.

Le 12 continué à herboriser.

Le Dimanche 13, Visité le Capitaine Rickard Commandant de la garnison.

Le 14 herborisé : vu en fleur, *Anemone hepatica* ; *Claytonia Virginica* ; *Sanguinaria*.

Vu nouveau genre de Plante designé par Linn. *Podophyllum diphyllum* et découvert il y a q. q. années en Virginie en passant par le Fort Chissel. Cette Plante est moins rare dans les fertiles terrains du Kentucky et de Cumberland. Elle se trouve aux environs de Knoxville. Le Dr Barton lui a donné le nom de *Jeffersonia* dans une description qu'il a donnée de cette Plante après avoir vu la fleur des Plants que j'avois rapporté à Philadelphie chez le Botaniste Bartram. Le temps de la fleur aux environs de Knoxville est vers le 10 Mars.

Le 15 reçu la Lettre du G^r Blount, en reponse à celle que je lui avois écrit sur la découverte d'un nouveau *Sophora* aux environs de fort Blount. Parti le même jour et couché à 7 M. de distance. Payé 2th 3rd po. Souper et Mays et fourrage des Chevaux. Bundle of fodder 2 p.

Le 16 Mars 1796 couché à un mile de Iron Work chez Mr Rice Lawyer, 30 M. de Knoxville. Remarqué en fleur, *Ulmus viscosa*, *Acer rubrum* fl. ♂ sur un individu et fl. ♀ sur un aut. arbre.

Le 17 couché pres de Bull's gap 30 Miles d'Iron Work.

Le 18 passé par Lick creek et par Green court house 18 Miles de Bull's gap.

• *Lygodium palmatum* Swz.—C. S. S.

Le 19 passé par Johnsborough 25 Miles de Green. Il y a plusi. marchands établis à Johnsborough qui tirent leur marchandises de Philad^e par terre.

Le Dimanche 20 parti de Johnsborough. Vu en passant M. Overton de Kentuckey, Major Carter de Wataga chez qui j'avois logé plusi. années auparavant avec mon fils et le Colonel Avery.

Dimanche 20 Mars 1796 remarqué en fleurs le *Corylus americana* fl. ♀ ayant les Stiles ou Stigmates de couleur purpurine. Le *Ulmus viscosa geminis aureis florib.* 4-5-6- andris, *stigmatibus purpureis.*

Le *Acer rubrum* fl. ♂ sur un individu et fl. ♀ sur un autre. Couché chez le Colonel Tipton 10 M. de Johnsborough.

Le 21 remarqué en plusi. endroits les Montagnes couvertes de *Sanguinaria*, *Claytonia* et *Erythronium* a feuell. maculées. Ces Plantes étoient en fleur. Le *Magnolia acum.* et *auriculata*; *Rhododendr.*; *Kalmia*; *Pinus abies canadensis*, *P. Strobus*; *Azalea* &c &c abondent au pied de ces M. Arrivé à Lime Stone cove et couché ch. Ch. Collier 18 M. du Col. Tipton.

Le 22 traversé Iron Mountain et arrivé au soir ch. David Becker 23 Miles sans trouv. de maisons.

Le 23 parti de chez Becker sur Cane Creek chez Rider 6 M. de Rider ch. Widow Nigh. 7 M. De Nigh ch. Sam. Ramsey. 2 M. De Ramsey ch. David Cox sur Paper Creek 4 M. et de Cox ch. Young 1 M. De Sam Ramsey chez Davinport 8 M. Total 23 M. couché chez Davinport. Remarqué le *Salix capreoides* en fl. sur le bord des ruisseaux.

Le 24 visité les hautes Montagnes vis à vis l'habitation de Davinport, arraché plusi. centaines de Plants; *Azalea lutea*, *fulva*; *Anonymos azaleoides*, *Rhododendron minus* &c.

Le 25 Mars 1796. Vu en fleur le *Corylus cornuta*,* *amentis* ♂ *geminis quandoque solitariis squamis ciliatis*; *antheris apice ciliatis, stylis coccineis.*

Cette espèce fleurit environ 15 jours plus tard que l'espèce de *Corylus americana* que l'on trouve dans tous les Climats. de l'Am. Septentrionale même dans la basse Caroline aux environs de Charleston. Le *Corylus cornuta* ne se trouve que sur les plus hautes montagnes et au Canada. *Corylus americana amentis* ♂ *solitariis squamis externe tomentosis margine nudâ*; *floris* ♀ *stylis coccineis.*

Le 26 herborisé et arraché des Plants d'arbrisseaux et des Plants fraiches pour les transporter dans le jardin de la Republique en Caroline.

Le Dimanche 27 Mars . . .

Le 28 préparé et emballé mes Collections de Plantes fraiches des Montagnes.

Le 29 parti de chez Davinport et venu coucher chez . . . Young. Violette à feuilles dentelées reniformes petiole velu et fl. jaune en pl. fleur sur les bords des ruisseaux et lieux très frais.

Le 30 continué ma route et par erreur pris une route à droite qui conduit

* *C. rostrata*, Ait.—C. S. S.

à Wilkes. Autre *Viole lutea scapus foliosus foliis hastatis* en fleur lieux frais et aussi moins humides. Celle-ci un peu plus tardive que la précédente. *

Le 31 arrivé chez le Colonel Avery et venu coucher à Morganton dit Burke Court house.

Le Vendredi 1^{er} Avril 1796, parti de Morganton. Couché chez Robertson cy devant Henry Waggener 30 Miles de Morganton.

Le 2 Avril *Epigea repens* en pleine fleur comme les jours précédents : sur plusi. individus toutes les fleurs femelles sans rudiments d'Etamines et sur d'autres individus fleurs toutes les fleurs hermaphrodites. Arrivé à midy chez Christian Reinhart près Lincoln. Resté toute la journée pour arracher des Plants du *Spiræa tomentosa*, qui croit dans les endroits marécageux.

Le Dimanche 3 Avril arrivé chez Bennet Smith 12 Miles de Lincoln : resté toute la journée pour arracher des Plants d'un nouveau *Magnolia* † à feuilles très grandes auriculées, oblongues, glauques soyeuses, surtout les jeunes feuilles ; les bourgeons très soyeux : Fleurs Petales blancs à la base de couleur pourpre ; Etamines jaunes &c. Au long du (Creek) ruisseau, sur le bord du quel on trouve ce *Magnolia* j'y ay vu aussi le *Kalmia latifolia*, *Viola lutea*, *foliis hastatis* ; *Ulmus viscosa* alors en fructification ; *Halesia* ; *Stewartia pentagyna*.

Le 4 parti et passé Tuck-a-segee ford sur la rivière Catawba 10 Miles de Bennet Smith. Pris la route à gauche au lieu de passer par Charlotte et couché à 11 Miles de Catawba river. ‡

Le 5 Avril 1796 à 12 Miles de distance rejoint la route qui conduit de Cambden a Charlotte. §

Pris des Plants de *Calamus aromaticus* qui se trouve aux lieux humides aux environs de Charlotte et de Lincoln. *Rhus pumila*. Couché auprès de Waxsaw Creek en Caroline méridionale 35 M. environ de Tuck-à-Segée ford.

Le 6 sur l'habitation du Colonel Crawford près Waxsaw Creek : Plante anonyme feuilles quaternées et perfoliées glabres, entières. Cette même Plante se trouve dans les Etablissemens du Cumberland et au Kentuckey, *Frasera foetida*. ¶ . . .

Passé par Hanging Rock ; il y a 22 Miles de Waxsaw à Hanging Rock : Pour aller à Morganton dit Burke Courthouse, l'on ne doit point passer par Charlotte, mais prendre la Route à gauche à 3 Miles ½ de Hanging Rock.

* *V. hastata*, Michx.—C. S. S.

† *M. macrophylla*, Michx.—C. S. S.

‡ Nota : avant de passer le ford j'avois déjeuné chez . . . Alexander, homme respectable de qui j'ay été reçu av. beaucoup de civillités.

§ Nota : Lorsque l'on ne veut point passer par Charlotte en allant à Lincoln, il faut 12 à 15 M. avant d'y arriver s'informer de la route qui prend à gauche po. aller passer Tuck-a-segee ford.

¶ It has been suggested that this may refer to *F. Caroliniana*, Walt. (*F. Walleri*, Michx.), —C. S. S.

Environ 20 Toises après la fourche des deux chemins (l'un desquels conduit à Charlotte) l'on trouve l'arbuste Anonyme* à racine rouge qui a le port du Calycanthus. Cet arbuste est celui que j'ay vu aux environs de Morganton. Couché auprès de Hanging Rock.

Le Jedy 7 Avril 1796 arrivé à Cambden ; cinq à six M. avant d'y arriver arraché des Plants d'un nouveau Kalmia vu q. ques années auparavant. Il y a 26 M. de Hanging Rock à Cambden.

Le Vendredy 8 Avril parti de Cambden passé par State's borough à 22 M. de Cambden et couché à Manchester 30 Miles de Cambden.

Le 9 mes Chevaux égarés pendant la nuit, ayant brisé la Cloture ou ils étoient renfermés.

Dans les ruisseaux, Callitriche americana ; fructificatio simplex, axillaris, sessilis, Cal. 2-phyllus, stam. unicum, filamentum longum, latere geminis, Germen duplex ? styli duo longitudine staminis, stigmata acuta.

Silene . . . cal. 5-fidus cylindricus, corolla Petala 5 (seu 5-partita usque ad basim), unguibus angustis, laciniis planis apice obtusis ; Stamina 10 basi corolla inserta ; Germen oblongum, Styli tres ; stigmata acuta ; Capsula unilocularis, semina plura numerosa, flores rosei. †

Parti l'après midi et couché à 15 Miles ayant traversé 10 M. de sables dit High Hills Santee dans l'espace desquels remarqué Phlox ; Silene . . . ; Dianthus . . . en fleur ; Lupinus perennis et pilosus en fleur.

Le Dimanche 10 Avril 1796 arrivé sur la Rivière Santee au lieu dit Manigault ferry ; remarqué avant d'y arriver Verbena (aubletia ?) et sur les rives de Santee, Anonyme arbor dont les fructifications (muricatis) couvertes de pointes molles étoient presque mures. † Manigault ferry est à 28 M. de Manchester.

Deux miles plus loin l'on prend à droite la route dite Gaillard road plus courte que la route ordinaire mais bourbeuse pendant l'hiver. Couché chez la V^e Stuard 18 M. de Manigault ferry. Taverne sale et depourvue de fourrage po. les Chev.

Le 11 parti de grand matin à 5 M. de distance remarqué Lupinus perennis et Lupinus pilosus en fleur. Distance de Charleston 40 à 43 Mil. Arrivé au jardin de la République 37 Miles de la V^e Stuard c-a-d. 47 M. de Charleston.

* It is not at all clear what shrub Michaux refers to in this entry. Mr. Canby, to whom several of the doubtful points in the Journal have been referred, and whose knowledge of the plants of the Allegheny region is now unrivaled, suggests that Michaux may have found *Darbya*. There is nothing in his herbarium to indicate that he ever saw that plant, which was found, however, by M. A. Curtis not far from Morganton.—C. S. S.

† Probably *Silene Pennsylvanica*, as suggested by Mr. Canby, or *S. Baldwinii*, as suggested by Mr. Meehan. In both of the species the petals are sometimes rose colored.—C. S. S.

‡ *Planera aquatica*, Gmelin.—C. S. S.

Récapitulation de la route des Illinois à Charleston :

De S. Louis des Illinois à Kaskias	4 Miles.
Au village S. Phillipe	45
A la Prairie du Rocher	9
A Kaskaskias	45
A la jonction du Mississipi et de la Belle Riv.	95
Au Fort Massac	45
A la Jonction de Cumberland dans la Belle Riv.	18
A Clark's ville sur la rivière rouge	120
A Nashville	60
A Bloodshed's lick	30
Au Fort Blount sur la riv. Cumberland	40
A West Point sur la rivière Clinch	90
A Knoxville sur la riv. Houlston	40
De Knoxville à Iron Work	30
A Bulls gap	30
A Green's ville	25
A John's borough	25
Chez le Colonel Tipton	10
A Limestone cove	18
A David Becker au de la de la Montagne dite Iron mountain	28
De Backer ch. Young.	20
A Morganton dit Burke	23
Chez Robertson	30
A Lincoln	16
A Tuck a Segée	23
A Wax Saw Creek	35
A Hanging rock	22
A Cambden	26
A Manchester	30
A Manigault ferry	28
A Charleston	70
	1123 M.
	lieues
	374½

CAHIER 10. 1796.

Le 27 Thermidor an 4^e de la République française Une & Indivisible (13 Aoust 1796 Vieux st) embarqué dans la rade de Charleston Caroline méridionale à bord du Navire Ophir Capitaine Johnston destiné pour Amsterdam. Le 14 et 15 resté à l'ancre.

Le 16 (30 Thermidor) levé l'ancre, mis à la voile.

Le 18 perdu la terre de vue.

Le 15 (30 fructidor) Septembre Tempête qui a duré jusqu'au 16 du soir.

Le 5 Octobre passé au travers d'une Escadre Anglaise commandée par l'Amiral Roger Curtis composée de 14 Vaisseaux de guerre savoir : 8 Vaisseaux à 2 Ponts, 2 à trois Ponts et 4 Fregates. L'une des Fregates la Melpomene vint traverser notre direction et ayant envoyé un Officier à bord de notre Navire, il visita les Papiers et les connoissemens ou Expeditions du Capitaine. Ayant vérifié que les Informations données par le Capitaine étoient conformes, il fut satisfait et lui souhalta un bon voyage. Dans la conversation, il dit que la guerre avec la France devenoit ennuyeuse aux marins, qu'ils ne faisoient point de prises, mais qu'ils esperoient que la guerre avec l'Espagne leur seroit plus avantageux et que la 1^{re} expedition seroit contre Manille. Cette Escadre étoit à l'entrée de la Manche plus près des Isles Scilly que d'Ouessant.

Le 18 Vendemaire an 5^e de la Republique française Une et Indivisible (9 Octobre 1796 V. St.) le vent étoit favorable et beau, mais à 5 heures du soir, il s'éleva une Tempête qui devint furieuse en moins de deux heures; elle continua toute la nuit en redoublant de violence et le Vent qui venoit de l'Est nous forçoit vers le rivage. A minuit le Capitaine avoit préparé les haches po. couper les Mâts. Enfin le jour arriva avant que le navire ait touché, mais le 19 Vendemaire, (10 Oct^{bre}) vers les huit heures le Capitaine voyant que la Sonde ne donnoit plus de profondeur suffisante se détermina à faire échouer le navire et après 4 à 5 violentes secousses il s'arrêta; alors les vagues tombèrent avec tant de rage et de violence que tout ce qui étoit sur le Pont fut emporté. Les voiles se déchirèrent en pieces en moins d'un quart d'heure. Un Mât fut brisé, le Navire étoit à demi renversé et recevoit quelques secousses qui durèrent environ une demi heure. Alors les vagues devinrent plus violentes et nous étions inondé de sorte que tous les hommes de l'équipage et moi aussi nous perdions les forces. Plusieurs Malles ayant été apportées sur le Pont furent jetées à la mer et les habitans d'un village nommé Egmond situé à un lieu environ de cet endroit retiroient tout ce qui arrivoit au rivage. Ils étoient au nombre de plus de 200 y compris 25 hommes de troupes envoyés avec un Officier pour nous secourir s'il avoit été possible. Enfin n'ayant plus d'esperance, plusi. Matelots s'attachèrent à des pieces de bois qui venoient d'être jetées et ils gagnerent le rivage. Quant à moi je m'étois toujours tenu attaché à un cordage ayant les jambes passées sous une vergue qui avoit été detachée pendant la nuit et attachée sur le Pont. Ayant été battu par les Vagues pendant trois heures, je sentois mes forces s'affoiblir et je descendis dans l'entrepont pour y attendre la fin de mes souffrances et la mort. Aussitot je perdis la Connoissance car je ne me souviens d'aucune des circonstances qui se sont passées jusqu' au moment ou apres avoir été transporté au village, j'y fus deshabillé et changé d'habits. L'on me fit boire deux petits verres de vin et ayant été approché d'un grand feu, la connoissance me revint environ une demie [heure] après; mais j'avois un tremblement de tout le corps qui dura toute la jour-

née. Je ne sais que par oui dire, car j'avois perdu connoissance, que vers les onze heures le Capitaine ayant vu le Canot tombé au bas du Navire, engagea trois hommes qui étoient restés, à me transporter dans ce Canot ainsi qu'un autre homme qui étoit dans la même situation ; ensuite l'on me mit dans une voiture pour me transporter au village et vers une heure après midy lorsque la connoissance me revint je me trouvay dans une Chambre aupres d'un grand feu avec de nouveaux habillemens et environné de 40 à 50 personnes des habitants du Pays. Je songeai aussitot à mes Caisses et mes Malles qui contenoient mes Collections dont j'en avois vu plusi. jeter à la Mer trois heures auparavant. L'on me dit que tout ce qui tomboit du navire ou avoit été jetté, arrivoit au rivage et que le detachment de troupes veilloit à ce que les Paysans ne pillassent point les Effets.

Le Capitaine qui étoit resté le dernier sur son navire s'en jetté à la nage, vers les deux heures, vint au Village dans une Charette car il étoit épuisé de fatigues ainsi que tous les hommes de l'équipage.

Les habitans du Pays nous fournirent tous les secours possible, Chemises, Habits, Pain, Viande, Eau de vie &c. et vers le soir tous les Naufragés se trouverent soulagés et retablis.

La totalité de mes Collections formoit seize Caisses et quatre Malles du nombre des quels seulement 5 a 6 disoit-on étoient venus au rivage ; Le vent souffloit avec la même fureur, et c'étoit le bruit general dans la bouche de tous, que le lendemain matin l'on ne verroit nulle vestige du Navire. Le vent, disoit-on, s'étoit un peu ralenti pendant la nuit et le lendemain le navire . . .

Il étoit resté jusque vers le soir, sur le navire, un homme qui ne sachant pas nager, auroit péri sans l'humanité d'un homme du village prochain. Il fit attacher une barre en croix au bout d'un petit Mât, et s'étant assis dessus, muni de cordages dont une partie servoit à le retenir contre la violence des vagues, tandis que 7 à 8 hommes avançoient le mât par l'extrémité opposée, ils parvinrent à le faire arriv. au Navire, alors cet homme qui étoit sur la piece de bois jetta un cordage à celui qui étoit resté au navire. Il se passa la corde autour du corps et l'ayant nouée, il se laissa aller dans la Mer et ainsi on le retira sur le rivage. Un nommé . . . qui avoit été Capitaine de navire dans la Marine Hollandaise ayant appris cette action d'humanité vint chercher cet homme. Il le garda chez lui plusi. jours et il lui donna une Tabatiere d'argent sur laq. étoit gravée la date de cette Action. Ensuite il s'employa pour obtenir de la Municipalité une attestation honorable de cette action. Cet homme fut mandé à Amsterdam ou il eut de la Municipalité une recompense publique consistant en une Boite d'argent remplie de pieces d'argent et gravée contenant les détails de sa bravoure &c.

Le Dimanche 9 Octobre, veille de la Tempête il étoit venu à bord du navire deux petits oiseaux mâle et femelle que je reconnus pour être le Pinson d'Ardennes.

Le lendemain de la tempête l'on trouva un oiseau aquatique marin sur le rivage, nommé par les Anglais Garnett.

Le 5 Frimaire, an. 5 (25 Nov. '96) parti d'Égmond-op-zee et arrivé à Amsterdam.

Le 6 fait emballer et marquer les Caisses et Malles.

Le 7 Diné chez le Citoyen Fousenbarte.

Le 8 embarqué mes Caisses sur un Bateau couvert pour Bruxelles, adressé au Citoyen l'Endormi ; led. Bateau doit passer par Anvers.

Le 9 obtenu les Passeports de l'Amirauté po. le transit de mes Collections sans être visitées par les Douaniers Hollandais.

Le 10 (30 Nov.) Ecrit aux Citoyens Bosc, Chion, Bussy, le Rev^d Nicholas Collin et au Gen^l Charles Cotesworth Pinckney, par la voye de New-York. Parti d'Amsterdam po. Leyde couché à Harlem.

Le onze frimaire (1^{er} Dec. 1796 V-st) arrivé à Leyde éloigné de Harlem . . . et d'Amsterdam . . .

Visité le Professeur d'hist. naturelle Brugmans a qui j'ay donné quelques graines d'Amérique. Acheté plusi. livres d'histoire naturelle.

Le 13 frimaire (2 Decemb.) parti pour La Haye et diné le même jour chez le Ministre Français pres la Republique Batave.

Le 14 (3 Decemb.) diné chez le Ministre.

Le 15 parti pour Rotterdam 5 heures de La Haye.

Le 16 frimaire visité les Freres Gevers dont le Cabinet d'Oiseaux est un des pl. rares et des mieux préparés qu'un aucun autre que j'aye vu précédemment.

Visité le Docteur Van Noorden, le Consul Le Roux la Ville . . .

Le 17 parti de Rotterdam passé par Dort et arrivé au Mordick, embouchure de plusieurs rivières tres dangereux à passer. Couché pres de Breda ville très fortifiée, 9 li. de Rotterdam.

Le 18 arrivé à Anvers 10 lieues de Breda.

Le 19 frimaire pris des informations aux Bureaux des Douanes sur l'arrivée de mes Caisses et Malles chargées à Amsterdam po. Bruxelles.

Le 20 frimaire, les Bureaux du Département étant fermés je n'ay pu terminer aucune affaire.

Le 21 visité le Citoyen Bruslé, Commissaire du Directoire Executif et le Citoyen Petit-Mongin Directeur des Douanes. Je fus très satisfait du patriotisme et de l'Esprit National du Cit. P. Mongin aussi bien que de ses sentiments de probité joints à un Esprit solide. Je terminay mes affaires quant à la sureté et à l'expédition de mes Caisses.

Le 22 frimaire parti pour Bruxelles.

Le 23 réglé avec le Cit. J. B. Champon fils pour l'expédition de mes Caisses et Malles.

Le 24 visité le B. de Reynegom et acheté de lui des Canards du Missisipi pour reparer ceux q. j'ay perdu par le Naufrage du 19 Vendemiaire.

Le 25 (15 Nov. v-style) parti de Bruxelles pour Ghent, arrivé le lendemain matin.

Le 26 visité M. Van Aken.

Le 27 parti pour Lille.

Le 28.

Le 29.

Le 30 parti de Lille.

Le 1^{er} Nivose (21 Dec. Mercredy V-st) passé par Douay, Cambray.

Le 3 arrivé à Paris.

Le 4 envoyé au Museum national quatre Canards (*Anas sponsa*) du Missisipi et deux Canards (*Anas galericulata*) de la Chine. Visité les Citoyens Thouin, Daubenton, Richard, Desfontaines.

Le 5 visité les Citoyens Cels, Tessieu et Andrieux, tous les trois attachés à la 4^e Division du Departement du Ministre de l'Interieur Agriculture.

Visité l'Héritier conservat^r du directoire Végétal &c.

Le 6 visité Mangourit, Le Cit. de la Croix, Ministre des relations exterieures, le Colonel Fulton &c. Assisté à la seance de l'Institut National de France.

Visité les Citoyens Lamarque, Jussieu &c.

Le 7 Ecrit au Ministre de l'Interieur, a Mangourit, à Chamon à Bruxelles. J'ay été à Versailles et j'ay couché à Satory.

Le 8 Nivose couché et diné à Satory.

Le 9 Visité Le Monnier et diné chez lui.

Le 10 Visité l'Héritier chez lui avec le G. Pinckney, diné chez Cels.

Le 11 Visité Jean Thouin, M^{de} Gilbert, M^{de} Le Clerc, M^{de} Trouve femme du redact. du Monit. cy devant Gorelli.

Le 12 Visité avec le General Pinckney le Jardin et le Cabinet d'Hist Naturelle. Diné chez M. Goy et visité M. Barquet.

Le 13 cherché un logement.

Le 14 visité de nouveau M. L'Héritier, M^r Dupont et diné chez le Directeur La Reveillière Lepéau.

Le 15 seance publique de l'Institut National des Sciences et des Arts.

Le 16 visité Richard, Thouin, seance de l'Institut.

Le 17 écrit au Citⁿ Petit-Mangin, Inspecteur des Douanes à Anvers et au Citⁿ Champon à Bruxelles.

Diné chez Remi Claye vis-a-vis le pont au change.

Le 18 travaillé au Déménagement.

Le 19 diné chez les Cit^{ns} Redouté Peintres au Louvre.

Le 20 diné chez Cels.

Le 21 j'ay été à l'Institut, mémoire de Ventenat sur le Phallus de Cayenne.

Le 22 Nivose visité le Pantheon.

Le 23 acheté quelques piéces de Menage. Visité M^r Dubois et le Ministre Benezech.

Le 24 visité Thouin, Delaunay et Desfontaines. Diné chez M^{de} Barquet.

Le 25 fait travailler le menuisier, écrit à Brux.

Le 26 visité Mangourit : Seance de l'Institut. Memoire sur les Rhinoceros Unicornes et Bicornes ; reçu une let. du Cit. Petit Mangin ; Il me marque que mes Collections n'étoient pas arrivés à Anvers le 22 Nivose.

Le 27 écrit plusieurs lettres.

Le 28 j'ay été chez Thouin ; rencontre le Direct. La Reveillère, Lepeau.

Le 29 visité chez le Citoyen Louvet.

Le 30 j'ay été chez le Citoyen Cels.

Le 1^{re} Pluviose, jay été à l'Institut National ; remis à Cels la lettre du Ministre de l'Interieur po. Être envoyée au Consul à Charleston.

Le 2 écrit au Citoyen Dupont et envoyé la lettre du Ministre de l'Interieur.

Le 3 j'ay été aux Bureaux du Ministre de la Marine et chez le Gen. Pinckney, Bernardde, S^{at} Afrique.

Le 4 écrit plusi. Lettres sçavoir : Bosc par duplicat ; Capit. Baas, Duverney ♀, Duverney ♂, Dupont à Charlest., Bussy à New York, Chion, Saulnier.

Le 5 Diné chez le General Pinckney.

Le 6 écrit au Ministre de la Marine et envoyé les Papiers concernant Spillard, Institut National des Sciences.

Le 7 écrit à Himely en Suisse et à M^{de} Himely à Charleston.

Le 8, 9 et 10 travaillé à mettre en ordre la collection des graines des Illinois : Diné chez Cels et donné une collection de ces graines.

FIN DU JOURNAL.

*Discussion on the Dynamic Action of the Ocean in Building Bars.**By Lewis M. Haupt.**(Read before the American Philosophical Society, January 18, 1889.)*

MR. PRESIDENT: A little more than a year has elapsed since the publication of my paper on the PHYSICAL PHENOMENA OF HARBOR ENTRANCES, and during this time it has provoked, as was expected, some discussion. It seems *à propos* that the record of this investigation should be entered in the publications of this Society, and I have, therefore, the honor of presenting for the Proceedings the following paper, entitled: DISCUSSION ON THE DYNAMIC ACTION OF THE OCEAN IN BUILDING BARS.

It is a reply to a Report of a Board of United States Engineers, before whom I had a hearing in January, 1888, relative to the methods proposed, and who rendered an adverse decision March 16, 1888, in which they ask for precedents. In presenting them it becomes necessary to take up the items of the Report *seriatim*, and reply to them specifically.

This representation seems to be the more necessary since this Society has done me the honor to endorse so highly the plans submitted in the paper before mentioned.

(1) The Report states that my paper presents—

“(1) A theory of ocean bar formation based upon the movement of the great tidal wave toward and along our coast; and (2) a theory of harbor improvement based upon the idea that this tidal action is the controlling element in the forces affecting the magnitude and position of the bars. Each of these theories will be briefly considered.

“Prof. Haupt calls attention to the natural division of the Atlantic coast into three great bays, and the effect they exert upon the relative height attained by the tide at different places along the coast. This subject is a familiar one and has no novelty. It was discussed by Prof. J. E. Hilgard in a lecture delivered before the American Institute more than seventeen years ago, in which he sets forth the only important facts connected with the tidal wave contained in the paper before us.”

As this quotation creates the impression that I claim originality for these statements of facts, long well known, I must respectfully refer to the only claims which I have made specifically in the paper submitted to the Board for examination (see pages 20, 21 of pamphlet on “The Physical Phenomena of Harbor Entrances”), from which it will appear that no such claims were made. I have also referred in that paper to the United States Coast and Geodetic Survey Reports and other documents, as containing the data upon which my “theory of improvement” is based. In the reference to Prof. Hilgard’s paper upon the tides, what he says is this: “Where a bay or indentation of the coast presents itself,

opening favorably to the tidal wave, thus developed and decreased in width from its entrance towards its head, the tide rises higher and higher from the mouth upward. This is due to the concentration of the wave by the approach of the shores and to the gradual shoaling of the bottom."* He then proceeds to apply this general statement to the three great bays of the Atlantic coast line, by stating the observed phenomena. I do not wish to be misunderstood as claiming originality for reference to phenomena which are described in elementary teaching. My special claims concerning the dynamic action of the flood tide were limited to the local effects produced at the inlets by the flood as the controlling element, to which I will refer again. The Board do not appear to distinguish sufficiently between my statements of laws and the practical application and observations I have deduced from them.

The Report continues :

"Prof. Haupt attributes great importance to the velocities along shore arising from the tidal flow entering these bays. He, however, presents no measurements or other data from which a definite estimate can be drawn as to the intensity of the forces thus generated or comparison made as to their importance when contrasted with the numerous other forces acting upon the bars. Littoral currents, due to the tidal waves, if they exist, are masked and controlled by other forces, and especially by the well-known powerful action of wind-waves on all sandy shores. It rests with Prof. Haupt to demonstrate that his tidal currents flow along the shores of these bays with a velocity sufficient to move the material forming the bars, and this he has failed to do. The only argument in favor of this conclusion is an assertion that the general conformation of the bars along the coast accords with what his theory requires. But the facts do not bear this out."

From the above it would appear (a) that the engineer is expected to make a definite estimate of one of the most variable forces of nature, which may conspire with or oppose others in producing its effects ; (b) that even the existence of littoral currents, due to tidal waves, is doubted by the Board ; (c) if such currents do exist, it must be proven that they have "velocity sufficient to move the material forming the bars;" (d) that no proof has been adduced in support of the proposition enunciated, but merely assertions made to fit a theory.

In presenting the evidence in reply to this Report, I propose to show :

- (1) That the *velocity* is an unimportant factor, and that material can be transported even where there is no motion of translation in the motor.
- (2) That waves breaking obliquely on a sandy shore will move the particles over a zigzag path, in a constant direction, which is cumulative.
- (3) That the flood tide produces such angular waves, and that littoral currents aid the movement.

* Smithsonian Report, 1874, p. 219.

(4) That the term *flood component* is more comprehensive than *flood current*, and includes the dynamic action of the breakers racing along the shore, as well as the littoral currents generated by the on-shore movement of the flood tide.

If it can be shown that the *flood currents* have sufficient energy to move materials, such as *bricks, coal, wreckage, etc.*, in a *direction opposed to the winds*, even during storms, and for distances measured by miles *in the direction of the flood*, it would seem to be sufficient evidence to prove not only the *existence* of such a force, but that it is "sufficiently powerful" to move *sand* beneath the surface in the same direction.

(a) As to measuring this particular force, I can only reply that instruments can do little more than give an imperfect record of a special condition for a comparatively short interval of time, and that the only intelligible gauge of the combined action of the physical forces is to be found in the effects produced, as revealed by Nature herself.

A board of engineers, in reporting on Galveston harbor, expressed the hopelessness of measuring this particular force when they said :

"It will be seen that the board does not attempt any prediction of the precise depth the jetties will maintain. Such predictions can best be made by those ignorant of experience in tidal entrances elsewhere, and having great confidence in the credulity of mankind."

Yet, notwithstanding this statement, it is immediately preceded by the statement of the expectation "that the proposed jetties, when the channel is once formed, will maintain some such depth as twenty-five or thirty feet."

As yet the channel has not been formed, although dredging has been tried and abandoned, and \$1,581,782.84 have been expended, chiefly on the outer bar, and the latest survey shows a reduction of depth to twelve and three-fourths feet, or less than existed, at times, before the works were begun.

In short, the measurement of this force is impracticable, since it will differ not only for different entrances, but at different points of the same entrance, and will also vary with the stages of the tide, duration and direction of wind, etc.

Speaking of the action of these natural forces, General Gillmore says : "The question is full of perplexing difficulties, which elude all the known methods of research by formulæ." 1876, p. 458, Rep. Chief of Eng'rs.

THE PROOF OF THE EXISTENCE OF THE FLOOD COMPONENTS.

(b) The Report says :

"Littoral currents, due to the tidal waves, if they exist, are masked and controlled by other forces, and especially by the well-known powerful action of wind waves on all sandy shores." * * * "The observed effects may be explained quite as well by the accepted wind-wave theory." * * *

prevailing direction of the storm winds, apparently ignored by Prof. Haupt, is an important element in the problem."

This wind-wave theory presupposes that the breakers and waves generated by prevailing winds and by great storms rolling along the beaches and transporting material in the direction of these movements, are the preponderating forces.

It is a plausible theory, and the effects of great storms do not admit of doubt, yet its general application in accounting for the peculiar forms of spits and bars will be found to fail signally in numerous instances, as will hereafter appear.

In replying to these points, I would respectfully submit that, as the effects of storms are immediate, and the changes readily observable, too much stress has been laid upon them, as compared with the work done by the ceaseless activity of the flood, the result of which for any one tide may be small, but it is cumulative. Thus, on the one hand, we have a great force operating for a *short interval of time* along a variable path; and on the other, a lesser force operating almost incessantly over a constant path. Assume that there are five or six great storms from the same quarter during a year, with no counter-storms to neutralize their effects. We have then an aggregate effect of some unknown quantity multiplied by 5 or 6 to be compared with some lesser unknown quantity multiplied by 730. In ten years the net result in the latter case would be tenfold greater; in a century it would be a hundredfold, and the effect would go on increasing as long as time endures. But one great storm, it must be remembered, may cut away material which the next may restore, and the resultant must always be the algebraic sum of the movements. The wind-wave theory is totally inadequate to explain the existence of the peculiar hooks and spits which have been built out directly in the face of the prevailing winds. For instance, witness the phenomena at one of the most striking and familiar formations on the coast, that of Sandy Hook. I will quote the observed facts from the Report of Profs. Bache and Mitchell, printed in 1856, U. S. C. S. Reports. Prof. Bache remarks: "It is known * * * that Sandy Hook is gradually increasing, growing to the northward into the main ship channel. A spot north of the Hook, where there was forty feet of water when Capt. Gedney made his survey, in less than ten years was nearly bare at low water. The importance of determining the cause of this increase, as leading to the means of controlling it, cannot be over-estimated." * * * "Various causes have been assigned for its growth, by the action of the waves and the winds." Speaking from the results of Prof. Mitchell's surveys, he says: "It turns out that this growth of the Hook is not an accidental phenomena, but goes on regularly and according to determinable laws. The amount of increase depends upon variable causes; but the general fact is that it increases year by year, and the cause of this is a remarkable northwardly current * * * along both shores of the Hook." * * * "For more than seven hours out

of the twelve, there is a northwardly current through False Hook channel." "This northwardly current runs on the inside for eleven hours out of the twelve. It is the conflict of these two northwardly currents outside and inside, and the deposit of materials which they carry to the point of the Hook, which causes its growth." * * * "Within a century it has increased a mile and a quarter."

Prof. Mitchell says: "Our attention was called not only to the more regular action of tides, currents, and the ordinary wash of the sea, but also to the effects following violent storms and other extraordinary phenomena." * * * "I will cite here the most striking case in this connection. Near the end of Sandy Hook we found many small household articles, and even human bones, which were ascertained to have drifted thither from the emigrant ship *New Era*, wrecked at Long Branch two years ago. To ascertain whether the same causes were still in operation, we chose a period of quiet weather, and made deposits of sinking bodies, at points along the coast a short distance from shore. The materials pursued the same path as that taken by the wreck matter of the *New Era*, driving on to the same part of the beach after many days."

This is conclusive evidence for this place to show that it is not the *wind wave*, but the *flood current* running along shore, that has produced this spit of sand, called Sandy Hook, extending for five miles in a direction *opposed* to the prevailing winds. The observations were made with a view to determine this very point, and leave no doubt as to its correctness.

The same cause, namely, the flood current, flowing westerly along the south shore of Long Island, has built out Coney Island to the westward in the face of a strong ebb and the north-west storms.

In a Report on the improvement of the bar near Sandy Hook, a board of officers say: "Among the agencies which tend to diminish the navigable depth, are: (1) Sand moved from the adjacent shores into the lower bay. From observation, it is known that there is a gradual movement of sand in the vicinity of the low-water line northward along the New Jersey shore, and westward along the Long Island shore into New York bay. Even without special observations, the fact is sufficiently shown by the form of Sandy Hook, a sand spit about five miles long, which has been slowly built during past ages by this northward movement of sand along the New Jersey shore." * * * "An examination of the charts of Coney Island shows that its western end is moving westward as sand is moved to it, the motion of its eighteen-foot curve amounting to 800 feet between 1835 and 1881."

No cause is assigned in this Report for these movements north and west. They are merely mentioned as observed facts, but it is not to be supposed that this distinguished board of experienced officers would ascribe these movements at right angles to each other to "the prevailing direction of the storm winds," or to the "accepted wind-wave theory," since the *prevailing* direction is neither west, north, nor north-west, but is off shore, whilst the *flood-tide movement* is north-west and reacts along shore to trans-

port the sand and drift in the direction of these extended spits. If the direction of the beach and drift movements are to be taken as indicative of that of the prevailing winds, as they should be, if the wind theory be true, then we must have the winds in the vicinity of Nantucket blowing from the S.W.; those at New York entrance from the S.E.; those along the Jersey coast from the N.E.; those at Cape Henlopen from the S.E.; those along the "Eastern Shore" from the N.E.; those from Chesapeake Bay to Cape Hatteras from the S.E., and from Hatteras to Georgia from the N.E., with sudden reversals at Capes Fear and Lookout, and so on. In short, to fit this theory, the prevailing winds must blow from different quarters over limited sections, which the observed results, as plotted from the Hydrographic Charts, do not confirm. But, on the contrary, the *flood component* is found to approach in the direction of the shore drift and satisfactorily to explain this movement. The wind-wave theory also fails signally as applied to the Great Lakes.

The same defect of the wind-wave theory exists when applied to the Gulf of Mexico, for in a special Report* on Galveston, by a board of engineers, dated New York, January 21, 1886, occurs this statement as to the potency of the winds in producing changes on the bar:

"Twenty and one-half per cent of the winds were from the N.E. and E.; their waves should give a south-westerly motion to the sand: thirty-six per cent were from the S. or S.W.; these should move the sand towards the north-east."

But, as a matter of fact, the resultant sand movement is south-westerly, or in a direction *opposed* to the prevailing wind; so that this theory is untenable in almost, if not in every instance.

The movements of the winds in the great Southern Bay may be seen from the subjoined statement of the Signal Service for this bay for the sixteen years from 1871 to 1886:

AVERAGE FREQUENCY OF WINDS, AS INDICATED BY THE NUMBER OF OBSERVATIONS.

Direction	N.	N.E.	E.	S.E.	S.	S.W.	W.	N.W.	Calms.	Prevailing Direction.
Movement	1775	1790	1890	1724	2538	2642	1841	2061	1249	S.W.
Percentage	10.9	11.0	11.6	10.6	15.6	16.3	11.3	12.7		

STATEMENT BY YEARS.

Date	1871	1872	1873	1874	1875	1876	1877	1878	1879
Average movement	3984	3735	4550	4739	4942	3889	5117	5034	
Prevailing direction	S.W.	N.W.	S.W.	S.W.	W.	S.W.	S.W.	S.	
Date	1879	1880	1881	1882	1883	1884	1885	1886	
Average movement	4902	4583	5655	5179	5050	4992	5325	5334	
Prevailing direction	S.	S.W.	E.	S.	S.	S.	S.	S.	

From which it appears that there is not a single year in which the prevailing winds are from the N.E., but that they are generally from the S. and S.W. Hence if the forms of the spits and channels be due to these forces, they should be just the reverse of those found to exist along the

* Report Chief of Engineers, Appendix S, 1886.

northern flank of the Southern bay, where they are best defined and most characteristic.

From a more detailed analysis of these tables of monthly wind movements, quoted from the Signal Service Reports by Lieutenant Carter, U.S.E., for the vicinity of Tybee Roads, Ga., it will be observed that the prevailing winds, which are from the S. and S.W., would tend to move the sand in a direction *contrary* to its observed motion, which is towards the S.W. To illustrate the relative intensities of the opposing winds, I have collated and compared the total monthly wind movements from 1872 to 1886, inclusive. The normal on-shore winds is S.E., hence those producing a north-eastwardly movement are the S. and S.W. winds, and those producing a south-westwardly movement are the E. and N.E. winds. The remaining directions being off-shore. Assembling these in groups by years, they exhibit the following results :

	Ratio in Thousands of Miles. Excess.
1872, the S. and S.W. winds : to the E. and N.E. winds, :	16 : 7 = 9
1873, " " " " " "	: 21 : 5 = 16
1874, " " " " " "	: 25 : 10 = 15
1875, " " " " " "	: 30 : 9 = 21
1876, " " " " " "	: 20 : 8 = 12
1877, " " " " " "	: 24 : 26 = -2
1878, " " " " " "	: 25 : 5 = 20
1879, " " " " " "	: 23 : 14 = 9
1880, " " " " " "	: 38 : 4 = 32
1881, " " " " " "	: 17 : 18 = -1
1882, " " " " " "	: 46 : 5 = 41
1883, " " " " " "	: 25 : 5 = 20
1884, " " " " " "	: 27 : 10 = 17
1885, " " " " " "	: 20 : 5 = 15
1886, " " " " " "	: 13 : 16 = -3

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From this comparison it would seem that the forces due to the prevailing direction of the wind, and tending to move material to the north-east, are overwhelmingly in excess of those operating in the contrary direction, or as 227,000 is to 6000 miles, an excess of 221,000 miles of wind movement from the S. and S.W. over that from the E. and N.E., or 14,733 miles per year.

It would seem, therefore, that the more deeply the wind-wave theory is examined, the more untenable it becomes, and that it is unnecessary to go further, if these tables represent the facts in the case, as I believe they do. Yet before closing this part of the argument, I beg leave to add that on the great lakes the littoral currents are found to divide at or near the *widest* part of the lakes, and to flow along shore in *opposite* directions towards the head and outlet, which could not occur were they caused by winds. How could a N.E. wind on Lake Michigan, for example, cause a current to the northward and southward from Milwaukee at the same time? These

currents are due to *surface oscillations*, which are interrupted and deflected by the form of the shore line, as along the coast.

With reference to the effects of prevailing winds in moving material, Prof. Henry Mitchell, of the U. S. Coast and Geodetic Survey, says :

“The motion of the waves is not always in the direction of the prevailing winds. This fact is noted in many publications. An example of this is shown by the action of the waves on the north side of Long Island, N. Y., which drifts the material westward, while on the south side the motion of the drifted material is eastward,* and yet the prevailing winds must be essentially the same on the two sides of the island. Another example is furnished by Lake Michigan. On the west side, south of Milwaukee, the prevailing motion is southward, and north of that place it is northward, and yet the prevailing wind must be the same. The prevailing wave motion must be influenced by the tendency which wave oscillations have to move from the deep waters as a centre towards the shores. In some instances the prevailing drift, too, must be modified by the prevailing action of the littoral currents.”

In short, the oscillations of the flood tide in deep water become converted into waves of translation on shelving shores, where they break at a permanent angle, and also generate littoral currents, both of which combine to move the beach material in the direction of the receding coast line.

FLOOD vs. EBB CURRENTS.

Again, I believe it to be an error to attribute the deep holes in the gorges of inlets to ebb action chiefly. In Ex. Doc. 78, Forty eighth Congress, in reference to the Narrows of New York bay, it is said : “The mean ordinary velocity at the Narrows is, during the ebb tide, about two feet per second, and from this a depth of 100 feet results.” In view of this statement, it is strange that a greater mean ebb velocity over Five-mile Bar in the Delaware is able to maintain only about seven feet of depth. In fact, it is not so much a question of velocity as of *reaction*, resulting from the compression of the *flood* in its efforts to pass through the gorge. The surveys show that the *bottom* currents run flood for about eleven hours out of twelve, and that the resultant of all the currents, ebb and flood, is strongly up stream. It is a notorious fact that refuse, etc., dumped in the lower bay, is carried by the flood to the upper bay, and it certainly will not be claimed that this effect is produced by prevalent storm-winds or waves. The flood resultant is also lower than that of the ebb, because of its greater density. Moreover, there can be no doubt that the extension of Cape Henlopen to the northward about 800 feet and the deposit there of over 5,000,000 cubic yards in the last half century, in opposition to the strong ebb, aided by the breakwater, and of the action of the N.E. and N.W. storms, and the cutting away of the *outer* beach about 600 feet near the *point*, is additional evidence that the flood compo-

* This is only true for the eastern end of Long Island.—L. M. H.

ment exists and has the power attributed to it, which it is necessary that maritime engineers should recognize in designing successful works of improvement.

The existence of such a force as that described, and the effects produced thereby, in transporting heavy articles, and, *à fortiori*, lighter ones, is still further abundantly attested by the following record of observed facts by competent persons. The extracts in Appendix "A" are cited to establish, as the author says, a "*fundamental principle, that the deposits on the ocean border are only made by the current of the flood tide,*" and are a complete confirmation of the conclusions I have reached from an independent and somewhat different line of reasoning, based upon a comprehensive comparative study of the coast charts.

They were compiled by the late Rear-Admiral Davis,* one of the most talented hydrographers this country has produced, and were accepted by such eminent authorities as Profs. Henry, Agassiz and Guyot, but were unknown to me until my attention was drawn to them by this discussion.

(c) VELOCITY INSUFFICIENT ?

"It rests with Prof. Haupt to demonstrate that his tidal currents flow along the shores of these bays with a velocity sufficient to move the materials forming the bars, and this he has failed to do."

It would appear from this opinion of the Board that they expect the results produced by the flood to be those due wholly to the *velocity* of the littoral currents, evidently overlooking those other and far more potent agencies which are at work in the flood, as previously proved with reference to New York entrance. I have, in general, designated this force as the "*littoral component,*" but it has been confused with and mistaken for the littoral *current*, and since the velocity of the latter is evidently small, it has been concluded that there can be no motion produced by this flood *component*. I have already cited numerous unmistakable instances of such motion and deposit in opposition to the prevailing wind theory, and will now merely call attention to the fact that these results may be produced even *without any littoral current*, since matter may be given a motion of translation without the motor itself having such a motion. For example, the usual helices for mixing concrete, transport the material from one end of the trough to the other, even against gravity, merely by the rotation of the axis, and water is raised by the Archimedean screw in a similar manner. The dynamic action of the waves racing along the beach is precisely the same. If the wave of translation, as it comes rolling in, does not strike normally (and in a bay it will generally be oblique), then it will

* Chas. Henry Davis, LL.D., U. S. N., was born in Boston, Mass., January 16, 1807, and entered the navy as midshipman in 1823, becoming Rear-Admiral in 1863. In 1861, he was a member of a board to report upon the condition of the harbors and inlets of the Southern coast. In 1859 he was made Superintendent of the "Nautical Almanac;" in 1865, of the Naval Observatory, and during his active scientific and professional life, he translated the "*Mécanique Céleste.*"

roll up the sand diagonally. The particles may possibly return normally with the under-tow, only to be again transported obliquely, and by this zigzag path it will advance in the direction of the receding beach; a littoral current merely intensifies this action.

This movement along shore is, therefore, largely dependent on the angle at which the flood breaks upon the shore, and this angle is practically a constant for a particular place, modified by the wind. But variability in the wind is not the controlling condition. It may sometimes increase the littoral drift, and at others neutralize it entirely. While there *may* be a prevailing north-east wind, as alleged, it would seem from an examination of the hydrographic charts, that the prevailing winds are off shore and the greatest storms from the south and west. In the middle bay particularly, extending from Cape Hatteras to Nantucket, the on-shore winds are limited to a few months during the summer. It would appear from these charts that the prevailing winds, and consequently the wind waves, can have very little influence in transporting material along the shores at or below the water line.

With reference to the existence of a constant angle for the breaking wave as well as of a littoral current, Prof. Henry Mitchell, of the U. S. Coast and Geodetic Survey, says: "From considerable experience in the study of waves upon the open coast, I have come to the conclusion that there is everywhere a *prevalent*, if not a *permanent*, angle at which the larger class of swell or rollers strike the general shore line;" also, "the coast currents in some places have a velocity of one-third of a mile per hour in thirty fathoms of water. They are in some localities nearly parallel, in others normal to the general trend of the shore line, and, so far as the few observations we have seen may indicate, the directions of ebb and flood are not usually opposed, although lying at an oblique angle with each other."

Dr. Whewell says, concerning the action of the flood tide: "The cotidal lines make a very acute angle with the shore line, and run for great distances nearly parallel to it. They are convex in the direction of their motion, the ends near the shore being held back by the smaller velocities in shallower water and other resistances."

But there can be no holding back without a reaction upon the shores, whereby the sandy particles would be dragged by the friction in the direction of this movement.

Mr. E. A. Geiseler, C.E., formerly Assistant U. S. Engineer and Superintendent of Construction on Light-house Service, says: "I fully coincide with Prof. Haupt in his opinions that littoral currents are produced by the entrance of the tidal wave into bays. From the higher crest the water *must* flow at first vertically to such crest towards the shore line, and on approaching the latter be gradually deflected into a direction parallel to it."

From the reference of the "tidal currents," to me personally, as their discoverer or imaginer (see quotation), it is necessary here incidentally to

disclaim any originality for the discovery of their existence. What I did claim and emphasize in my paper was not that, but their efficiency and controlling influence as bar-building agencies, and I applied the knowledge of the direction of the flood component to the designing of a plan for successfully resisting these encroachments. Although hydrographers are familiar with the well-known increased height of tide in bays, and with the existence of the littoral currents, they appear to have failed to apply these phenomena to account for the transportation of drift, until they were found, by a specially conducted series of surveys and observations, to be the causes of such formations as are instanced in the case of Sandy Hook. Yet, notwithstanding ample evidence, there are many persons who still adhere to the wind-wave theory as exerting the most potent influence.

(d) "*That no proof has been adduced, but merely assertions to fit a theory.*"

After the instances already given, it would seem to be superfluous to cite as evidence any more facts. The theory was not conceived first and then generalizations added to fit it, but it is the logical outcome of a critical study of the forms, slopes and positions of the topographical features at a large number of entrances, taken in connection with the general form of the coast line, and the conclusions I have reached are merely confirmatory of those deduced at earlier dates by Profs. Bache, Mitchell, Hilgard, Rear-Admiral Davis, some of the members of the United States Corps of Engineers, many civil engineers, and by some light keepers, life-saving crews and wreckers. I think it is clearly demonstrated that there is a flood component of greater or lesser intensity, depending on the angle at which the flood movement breaks upon the shore, and that it is the cumulative effect of this force that builds and moulds the bars at harbor inlets, or wherever there is a break in the beach. Such an opinion accords with observed facts, explains them satisfactorily, and is accepted by the most experienced hydrographers and maritime engineers.

The Report of the Board continues :

"For example, we have authentic records at one of the sites he (Prof. Haupt) quotes, Beaufort, N. C., which prove that during the last sixty-seven years there has been a cycle of changes, and that the channel over the bar which, at present, occupies the position required by his theory, would have borne testimony adverse to its truth a few years ago. Indeed, such changes are a common occurrence along the coast. The accepted opinion of engineers who have had large experience in harbor works on sandy coasts, is that the action of oblique wind waves is potent in causing the movement of material along the shore, and that the prevailing direction of the storm winds, apparently ignored by Prof. Haupt, is an important element in the problem."

The above statement concerning the cyclic changes which are found to exist at the inlets, is but another confirmation of the correctness of the

theory. These changes occur *in the same direction* through a cycle of years, and are due to the relation between the flood and ebb forces. The flood resultant, by its constant encroachments from *the same direction*, trespasses upon the path of the ebb, crowding it over towards shore, and filling its bed, until it is no longer able to find an escape in the old path, when, aided perhaps by a storm, it will break out in a new channel, only to be returned after a series of years over the same ground. If these changes were due to storms only, they would be far more variable, and, in the interval between storms, they would be comparatively permanent. The channel would be thrown to the south-west by a north-east storm, and to the north east by one from the opposite quarter, when equally exposed, and there they should remain until again disturbed by this violent action ; whereas such is not the rule.

The changes at Beaufort and all other places are readily explained by the influence of this unceasing flood resultant, modified only temporarily by storms.

The reason why the *storm-wind* theory is the accepted one, is doubtless due to the fact that the effects are, for the time being, more manifest to the superficial observer, whilst those of the flood component are imperceptible excepting after the lapse of considerable time. The effect may be likened to the slow growth of an organic body, not visible to one watching it constantly, but very apparent to one who makes examinations at long intervals. The storm winds, it will be seen, are not ignored by me, but are merely relegated to their true position of secondary agencies, which may co-operate with or oppose the forces of the flood tide.

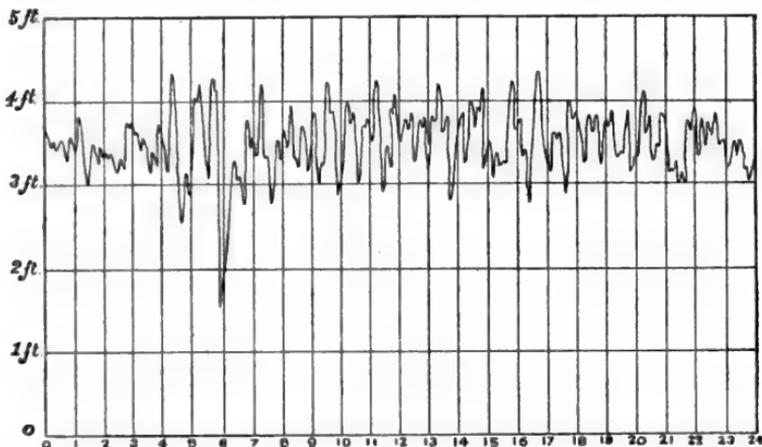
In consequence of this cyclic movement it is evident that it would be a mistake to assume that *all* the ebb channels should remain flexed in a certain direction along one flank of a bay and in the contrary direction on the opposite flank, as some have supposed must result, or that the changes would occur simultaneously at all places.

The Board continue :

“ Nothing which Prof Haupt has advanced suggests that his tidal current should be substituted as the ‘controlling’ or even as an important element in our ocean bar formation. The observed effects may be explained quite as well by the accepted wind-wave theory. Indeed, the fact that such bars abound on shores where no sensible tidal waves exist, proves that no new theory need be invoked.”

The first part of this statement has already been answered, and if the last part were irrefutable the theory would be untenable. But since like causes must produce like effects, if the observed effects are found on tideless shores, we must expect to find the same causes—and so we shall. Whether the motor be universal or terrestrial gravitation, the agency is primarily a wave of oscillation which in shallow water becomes a wave of translation, breaking generally obliquely upon the shore and producing a resultant movement along the beach. It is a well-known fact that on the

Great Lakes which, in the passage quoted, are undoubtedly the waters alluded to by the Board, there are continual oscillations of even greater magnitude than are found to be produced by the tides in the Gulf of Mexico, and that they are much more frequent, hence the effects more marked. In the observations made by Rudolph Hering, Consulting Engineer for the Chicago Drainage Commission, he shows for one day not less than seventeen oscillations of over a foot in amplitude, and one of them exceeding two and one-half feet. (See diagram.)



Fluctuations of the water surface of Lake Michigan, as recorded by an Automatic Gauge, Chicago, Ill., August 16, 1886.

NOTE.—The wind was from the north-west in the morning and the south-west in the afternoon. The lake here is sixty miles wide and from twenty-five to fifty fathoms deep.

Mr. Hering says : “The winds and barometric pressure produce a constant oscillation of the surface, and at times a swinging motion from shore to shore. * * * One oscillation on the above diagram is distinctly recognizable as lasting about twenty minutes, which is the swing across the lake. The greatest of these, as will be seen, was over two feet. The oscillations are relatively greatest at the south end of the lake.”

Concerning these observed oscillations of the lake's surface, Mr. O. B. Wheeler, an experienced Assistant on the Lake Surveys since 1862, who was continuously employed upon these surveys for thirteen years, and subsequently at intervals to date (1888), writes as follows :

NOTES ON THE WATER-GAUGE RECORDS OF THE GREAT LAKES. BY O. B. WHEELER, M. AM. SOC., C.E.

“From my remembrance of the discussion of the self-registering tide-gauge observations made at several points and for several years on the Great Lakes, I offer the following :

“In these gauges the ordinary wind waves and waves from passing

vessels, or from any local, incidental causes, were eliminated by means of the perforated boxes surrounding the float.

"A fair representation of the record is shown in the illustration by Rudolph Hering in his paper to the Engineers' Club of Philadelphia; although there is a distinctive curve for each locality of observation, and the curve for Chicago would be distinguishable from that of Milwaukee or from that of any other locality.

"The curve at Milwaukee showed that for more than half the season of observation there were series of waves coming in at intervals of approximately two hours, whose height were from one-third of a foot to one and a half feet. Generally the waves are subdivided, sometimes very deeply, into two or more parts. At Milwaukee, on Lake Michigan, there were more nearly eleven of these waves in twenty-four hours, and at Marquette, on Lake Superior, eight in the same length of time. The two-hour interval at Milwaukee was supposed to be due to the time required for a wave to travel across the lake and return, where the width of the lake was nearly eighty miles and depth 400 feet.

"Greater disturbances, known as 'seiches,' occurring generally several times in a season and lasting several hours, bring waves upon the shore at intervals of twenty or thirty minutes, the crests of which waves exceed two feet in height above the troughs. The cause of this phenomenon is probably a difference in atmospheric pressure on different parts of the lake, and the more decided 'seiches' probably result from severe cyclones. The same cause may for the most part account for the generation of the two-hour waves above noted.

"There is also a change in the relative water level of the two ends of a lake due to the direction of the wind, but the wave thus produced has generally a day or more in length of duration."

Mr. G. Y. Wisner, a colleague of Mr. Wheeler's, also an experienced Lake Survey Assistant, writes, under date of March, 1888, that "the laws of the natural forces, which you have so ably set forth in your article, as applied to tidal harbors, hold equally true with a large number of the harbors on our lake coasts. It is true the tides on the lakes are imperceptible, yet other natural causes combine to produce the same effect."

"Owing to unequal barometric pressures on different portions of such vast bodies of water, series of waves are generated which are usually about an hour in passing from crest to crest at any given point, and vary all the way from six to eighteen inches in amplitude. These waves follow each other along the shores similarly to those of flood tides; their effect in generating littoral currents depending, of course, on the general direction in which the waves approach the shore and the conformation of the coast line. I have noticed the rise and fall of the lakes due to this wave action, for days at a time, in perfectly calm weather, with almost the regularity of clock-work, and have observed currents generated in the open lake of over three miles per hour. * * * Most of the lake har-

bors are the mouths of rivers, and exhibit in a very striking manner many of the characteristics which you have described."

Mr. Wisner has subsequently prepared a paper on this subject for the use of the profession, which paper is published in the "Proceedings of the Engineers' Club of Philadelphia" (1888), giving the practical applications of these phenomena to several of the lake ports.

The application of the observed principles to the lakes becomes very simple. As a lake contracts at its head (as at the west end of Lake Superior, the south end of Lake Michigan, the west ends of Erie and Ontario) it may be regarded as a large bay with converging shores. The oscillations in midlake are reflected along these shores and broken into waves of translation rolling towards the bight. Here, if there is any land drainage entering the lake, there is an opposition between the drifts in these directions, and a precipitation of materials usually from both shores ensues, forming long spits, as at Minnesota and Wisconsin Points, on Superior bay, and at Chequamegon spit on the bay of the same name. Similar formation takes place from the same causes at Maumee bay, at the head of Lake Erie, and at the end of Lake Ontario. Like movements in Lake Huron drive the sands into the St. Clair river and thence into the enlargement known as Lake St. Clair, which was so shallow before improvement, as to have been the controlling feature on the lower lake navigation.

The same action at the head of Lake Michigan has, I believe, closed the ancient southern outlet, via the Kankakee river, to the Illinois and Mississippi, and is still at work closing the mouths of the streams at that and other points and creating extensive deposits of sands. The same effects are to be found generally at the indentations of the shore line of sandy formations.

Prof. Hiero B. Herr writes from Chicago, under date of March 30, 1888, that "our sand-propelling currents are southward on the south half of the shore and northward on the north half. This seems clearly proven by the rapid accumulation of sand deposit on the north side of projecting piers in the former case, and on the south side in the latter."

From these numerous instances, therefore, it is believed to be a fact that this shore component of the lake oscillation and "seiches," be they produced as they may, by wind or barometric disturbance, is the principal agency in producing the characteristic forms found there, as on the alluvial coast line.

This brings us to the second branch of the Report of the Board, in which they comment upon my practical deductions.

The Board say :

"The practical deductions drawn by Prof. Haupt from his theory are illustrated by proposed plans of improvement at the harbors of New York, Charleston and Galveston. They are all similar in character, consisting

of a single detached jetty made up of elliptical curves presenting their cusps to oppose the supposed advancing component of the tidal wave, and of an in-shore extension to concentrate the flood current upon a secondary or 'beach' channel, which it is proposed to keep open. At New York and Galveston 'detached breakwaters' are indicated, to prevent the ebb from being diverted from its course, and to train it upon a point where, according to his theoretical deductions, 'the bar-building forces are weakest.'

"Without going into any general discussion of this typical plan, it will be sufficient to point out: (1) That since no provision is made to close the 'beach' channel during ebb tide, it will carry off water which might be more usefully applied to scouring out the main or 'ebb' channel, and that one good channel is certainly better than two bad ones; (2) that this proposed main channel, in the case of Charleston, is so lengthened by its location, that the working energy, due to the difference of head between the harbor and the outer ocean, is frittered away by being distributed over a path needlessly long; and (3) that the degree of contraction on the bar is ill-defined, uncertain and altogether insufficient."

To any one at all familiar with the original plans of the Government engineers for both Galveston and Charleston, the above criticism of my methods must appear as singularly inconsistent. If there are serious objections in the plans which I have submitted, they must apply with much greater force to those now being executed at so great expense to the Government.

The whole merit of the submerged jetty plan, as adopted, was based upon the theory that the flood would be admitted freely over the jetties at their shore ends, and be, at ebb, trailed by them out across the bar, where the jetties were to be raised to or above the surface of the water. If the loss of ebb energy through the comparatively small lateral opening left in my plans be of serious amount, it would be far more so when the lateral openings amount to nearly four hundred per cent of the section at the mouth of the jetties, as is at present the case at Charleston.

As to my proposed channel being so lengthened as to fritter away the working energy due to difference of head, it is only necessary to say that the point of escape for the ebb at all these sites is, in my plans, nearer the gorge, giving a greater slope and more rapid discharge than in the plans now under construction. At Charleston, the most unfavorable case for me, it is but two and seven-eighths miles distant from the gorge, while the mouth of the Government jetties is about three and one-eighth miles distant.

"ONE GOOD CHANNEL *versus* TWO BAD ONES."

There is no doubt that one good channel is to be preferred to two bad ones, but the counter-proposition that "two bad ones" are better than no good one is likewise true, and when it is remembered that the forces relied upon to create and maintain the *two* channels are distinct, are operating

at different times and places, there would seem to be no reason why they may not both be created. A fairer statement of the case would be that two good channels would be better than *one* poor one. *Apropos* of the amount of water escaping laterally during the ebb through the beach opening in the breakwater, the Reports of the Chief of Engineers are explicit in stating that it would be much less than the amount admitted during flood; and in view of the beneficial effects of the 600 feet gap in the great north wall of the Dublin entrance,* there would seem to be no room left for doubt as to the benefits to be conferred by such a vent as that which I have proposed. The loss of energy through this lateral outlet during ebb would be immaterial; as it lies close under the lee of the shore, and nearly the whole of the ebb is trailed to discharge over the bar at the curved outer end of the breakwater.

In discussing the Government projects, it was originally deemed fundamental to their success that the flood tide should be admitted freely to secure the necessary prism for ebb scour, and in the design for the beach channel entrance, which I have given, I have provided a form that must pass *more* flood than ebb, and hence the excess would go to increase the ebb at another point of the bar. It is this *difference* of quantity upon which I rely in part to increase the efficiency of the ebb as well as the conservation of its energy over nearly one-half the crest of the bar. These principles are universally accepted as sound. They certainly will not fritter away the energy available for scour in an "ill-defined, uncertain, or altogether insufficient action," but must concentrate all there is to be had over the most limited as well as the weakest section of the bar.

In considering the utility of high jetties for Charleston, the late General Gillmore said: "The excess of ebb over flood scour is due to two causes: (1) To the rainfall of the natural drainage area; (2) To the volume of water carried in over the bar by waves of translation, which afterward form a part of the general outflow. High jetties, or those which rise above the level of high water, will cut off all supply from this source, except what little is carried in between them." * * * And he adds: "There are few maritime constructions, says M. Minard, less susceptible of general rules and more dependent on local influences than jetties. He might have added that we are as yet unable to deal with these local influences with much confidence or satisfaction." To avoid these defects of high jetties the Government has tried the submerged plan with, thus far, no better success.

CONCLUSION OF THE BOARD.

"In fine, the Board, after an attentive study of Prof. Haupt's paper, supplemented by a personal interview, in which he was afforded every opportunity to explain and elaborate his views, find that they are purely theoretical, are unconfirmed by experience, and contain nothing not

* See Franklin Institute Journal, for April, 1888.

already well known, which has a useful application in the improvement of our harbors.

“A copy of the printed paper submitted to the Board by Prof. Haupt is herewith enclosed. Respectfully submitted.

(Signed by) “THOS. LINCOLN CASEY, Colonel Corps of Engineers.
 “HENRY L. ABBOT, Col. of Engineers, Bvt. Brig. Genl.
 “C. B. COMSTOCK, Lt. Col. of Engrs., Bvt. Brig. Genl.
 “D. C. HOUSTON, Lt. Col. of Engrs., Bvt. Col.
 “W. R. KING, Major of Engineers.”

From the above concluding remarks it will be seen that the Board find in the paper submitted “nothing not already well known, etc.,” and that the plans “are purely theoretical and unconfirmed by experience.” These conclusions appear to me to be contradictory, since if, on the one hand, they are new and untried, they could hardly be expected to be confirmed by experience, or if, on the other hand, they are “well known,” they are, by that expression, impliedly recognized as true, and their application should be readily confirmed or denied by the supposed existing precedents. But none have been cited by the Board.

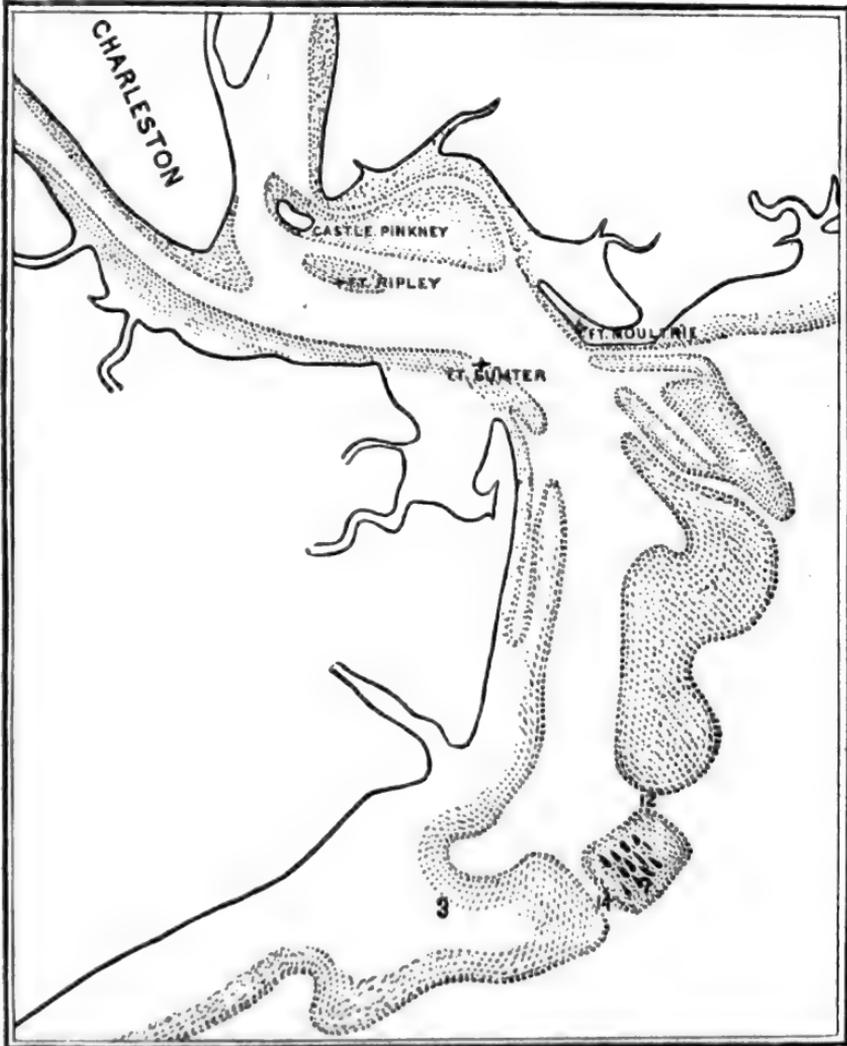
In the paper of Prof. Hilgard, to which the Board allude in their Report, he describes the, to him, *unexpected* effects produced during the war by the sinking, on the Charleston bar, of the so-called “stone fleet,” thus obstructing the entrance to the harbor.

Prof. Hilgard says :

“On the accompanying diagram is seen the ‘stone fleet’ sunk in the main channel, which at that time had twelve feet of water at low tide, where the figure seven indicates the present depth. There was, moreover, another channel, making out more to the southward, with nine feet of water, where the figure three indicates the present depth. The vessels were placed checkerwise, in such a manner as to impede navigation, while interfering least with the discharge of water. The effect, nevertheless was the formation of a shoal in a short time, and the scouring out of two channels, one on each side of the obstructions, through which twelve and fourteen feet can now (January 27, 1871) be carried at low water. The increased waterway thus given to the ebb tide caused it to abandon the old nine-foot channel on the less direct course to deep water. We have here the total obstruction of a channel, which was of considerable importance to the southward trade, by new conditions introduced at a point four miles distant from where the effect was produced, and we are warned how carefully all the conditions of the hydraulic system of a harbor must be investigated before undertaking to make any change in its natural conditions, lest totally unlooked-for results be produced at points not taken into consideration.”

So that instead of obstructing the entrance this accidental barrier to the flood actually deepened the water on the bar two feet, and induced the ebb currents to effect an escape in its lee, closing a channel several miles

to the westward by furnishing a line of less resistance, and withdrawing the water from the former distant channel. Moreover, it cut a second channel quite as deep as the first on the opposite side of the fleet, thus creating two channels as good or better than before, instead of the one formerly existing on the site of the fleet.



There could not be found an instance more fully confirmatory of the soundness of the principles I have laid down and proposed to use, than this accidental practical experience, and yet the amount of the protection afforded by the "stone fleet" was much less than that I have provided,

and it is situated at a point where its effects might have been considered "altogether insufficient, uncertain and ill-defined."

(The cut is reproduced from Prof. Hilgard's paper, Smithsonian Report, 1874, page 221.)

The accompanying letter, recently received from Prof. Hilgard, is conclusive as to the probable efficiency of these plans :

"1349 L St.

"WASHINGTON, May 20, 1888.

"MY DEAR PROF. HAUPT: I have received your interesting paper on the 'Physical Phenomena of Harbor Entrances,' in which you describe the peculiar forms of the bars and spits found at the inlets along the sandy cordon of islands defending the Atlantic coast line and give your explanation as to the forces producing them; ascribing them chiefly to the energy of the flood tide as affected by the general form of the coast line.

"In this I think you are entirely correct, as it is undoubtedly the unceasing activity of the flood that produces the forms which are so characteristic of harbor entrances, and not the wind waves produced by prevailing winds. The direction of motion of the beach sands is, as a rule, the same as that of the flood tide along the shore. It is modified by great storms, but only temporarily, and in a short time the flood reasserts its supremacy and the channel returns to its normal position.

"In applying this physical fact to the plans for improving the bars, I believe you have proposed the best form to resist the encroachments of the sand and yet admit the flood tide freely. These are fundamental conditions, and you have fully met them while providing at the same time ample facilities for navigation.

"The successful operation of your proposed plan is well illustrated by the accidental experience with the stone fleet on Charleston bar, described in my paper on 'Tides and Tidal Action in Harbors,' published in the Smithsonian Report for 1874. From that instance it is seen that by obstructing the inflow of sand and inducing an ebb current, two good channels were formed, the better one to the leeward of the obstruction. Your plans would change the conditions of equilibrium in favor of the ebb, and the length of your breakwater is much less than that required by existing methods.

"I trust that they will be tried at some suitable entrance along the Atlantic or Gulf coast.

"Yours, with great regard,

"J. E. HILGARD.

"PROF. LEWIS M. HAUPT, University of Pennsylvania."

The effects to be anticipated from the shore flank of the breakwater are best instanced by those found at the Delaware breakwater, where a straight barrier of half a mile in length stands at such an angle to Cape Henlopen as to have been originally tangent to it when projected in 1828. Its end is about a half mile from shore, and it is open to the north-west

storms and ebb scour. It has maintained a channel 600 feet wide and over thirty feet deep through the shoals, which have been built upon either hand, all the way to the deep water of the Atlantic, and notwithstanding this concentration of the ebb forces through this funnel-shaped passage, the flood was not prevented from rolling Cape Henlopen about 800 feet farther north since the commencement of the construction of the breakwater. These detached instances, with that of the Dublin harbor north wall, are all conclusive, so far as any precedents can be, as to the effects to be expected from my plans, and when it is remembered that the cost of executing them would be less than half that of the high and tight jetties now proposed, and that the effects of time will be to reinforce and strengthen rather than to destroy them, it would seem that, in justice to the commercial interests of the country, an opportunity should be found for at least giving them a fair trial.

In further confirmation of the requirement that the jetty should be on the side toward the flood component, reference is made to the experience of a private company, at Aransas pass, on the Texas coast, in 1869, which is believed to be the only case of this kind on record.

Here the movement of sand is *southward* at the rate of over 200 feet per annum, and this company expended less than \$10,000 in building a short jetty only 600 feet long from the *north* shore and extending out on the *north* side of the channel.

“These jetties, crates or caisons, as they are variously called by the builders, were made of live-oak poles, spiked together in the general form of a triangular prism and placed longitudinally. Each crate was about eight or ten feet long, six feet high and six feet wide at the base. * * * They were ballasted with a few hundred-weight of stone, filled with brush and sunk in two or three parallel rows. They were expected to act as a nucleus about which the sand would settle, and close up the secondary channel, thus directing the flow of water directly through the channel of the bar. From the fact that the secondary channel has shoaled about two feet, and the main channel deepened about two feet since placing the crates, it may be supposed they have contributed to produce this result.”*

In a later Report, dated February 1, 1879, Maj. Howell, then in charge, in commenting upon this early precedent, remarks :

“From my remembrance of a verbal description of the work * * * the cribs were triangular in cross-section (dimensions not known), and their parts very imperfectly fastened together, and besides seem to have been made of any timber and lumber that came handy—some live oak, but mostly yellow pine scantling, four inches by six inches.

“Some of these cribs were filled with brush and stone when sunk in place, but it is said that others were simply ballasted so as to sink them.

* Report of the late Lieut. E. A. Woodruff, Corps of Engineers, dated April 1, 1871, *vide* Report Chief of Engineers, 1871, p. 526.

During the work of construction some of the cribs near the shore were broken up and washed away.

“When the work was suspended it is said there was a twelve foot channel across the bar, which was maintained for several months, possibly until the teredo and the waves had destroyed a considerable part of the frail cribwork.

“In 1871, when the late Lieut. E. A. Woodruff made a reconnoissance of the pass, he was unable to find any trace of the work. It is said that as the work gradually disappeared the channel across the bar gradually returned to its normal depth. I consider my information reliable as to the above described work and its effects.”

These extracts show very conclusively that, so far as this frail structure went, it was in the proper place, and did effective work in improving the channel by keeping out the sand and preventing the dispersion of the ebb. Its form and materials might have been improved to great advantage.

The Government failed to profit by this precedent, however, for in August, 1897, the engineer officer in charge of this pass, reported that :

“The work designed to deepen the channel over the bar, consisting of a single jetty, constructed upon the south side of the entrance, has had no important effect upon the bar, and is in a dilapidated condition. The channel depth, over the bar, is now eight and one half feet, and the channel crosses the jetty.”

Thus it appears that this jetty was attempted on the wrong side (the south) of the channel, and that the ebb discharge in seeking the line of least resistance was forced over the crest of the submerged work by the bar of sand rolled up by the flood component.

JETTIES IN PAIRS.

This paper would be incomplete without the evidence collected by experienced maritime engineers of other countries, as to the results of similar works elsewhere.

In his digest of jettied entrances, Sir Vernon Harcourt says in general of the jetty system :

“The jetties also, in most cases, were extended in the hope of reaching deep water, which proved fruitless, owing to the progression of the foreshore with each extension of the jetties. Next artificial sluicing basins were formed, to provide a larger mass of water for sluicing, with the additional advantage that the issuing current was nearer and better directed for scouring the entrance. Lastly, dredging with sand-pumps is being largely employed for deepening the channel beyond the jetties. The parallel system has not proved successful in providing a deep entrance without constant works. * * * Experience has shown how jealously encroachments on the tide-covered lands should be prevented, and the uselessness of prolongations of the jetties. * * * Parallel jetty harbors are one of the most difficult class of harbors to design and maintain successfully.”

Again, the President of the Institution of Civil Engineers of Ireland, and Engineer of the Port of Dublin, J. Pursur Griffith, writes with reference to the alluvial harbor at Ostende, Belgium :

“It is not necessary to enter into a detailed description of the successive additions made to the jetties and sluicing reservoirs * * * suffice it to say, that the jetties extend at present about 300 metres seaward from the shore line, and the maximum sluicing capacity of the reservoir is about 1,100,000 cubic metres. The result of these costly works cannot be regarded as satisfactory. The channel is still shallow, while the bar a short distance beyond the pierheads still forms a dangerous obstruction. *Depths of water at the entrance to a port is more needful during rough, wild weather than in calm, and it is just at such times that sluicing operations similar to those at Ostende fail.*”

Speaking of the jetty system in general, he says :

“The system so generally adopted in Continental ports, of parallel or nearly parallel jetties, extending only to comparatively shallow depths, appears to be radically wrong in principle. Their tendency, generally, is to act as groins, and make the sandy shore extend outwards until the sand passes around the pierheads where the action of the sea heaps it up in the form of a bar.”

It seems unnecessary further to multiply instances of the failure of the principle of parallel jetties in tidal waters, and it is confidently believed that the single-curved barrier placed upon the bar as an obstruction to flood-wave and sand movement will be found satisfactorily to fulfill the requirements of these problems.

APPENDIX A.

Extracts from a paper, by Charles Henry Davis, Lieut. U. S. N., entitled “The Law of Deposit of the Flood : Its Dynamical Action and Office.” Printed in the Smithsonian Contributions to Knowledge, Vol. iii. Referred to a Commission consisting of Prof. S. Agassiz, Prof. A. Guyot and Prof. Joseph Henry, and accepted December, 1851.

“The views in the paper* were founded upon observations and examinations of various parts of the alluvial coast of the United States, through a series of years, and led to the discovery that the shape, extent and distribution of the loose material of which they are composed—quartzose sand—were chiefly determined by the action of tides.” * * * “It

* The author here refers to a previous memoir on the same topic.

was laid down as a fundamental principle, that the deposits on the ocean border are only made by the current of the *flood tide*. * * *

“The mode of operation of the flood is essentially accumulative. Its tendency, also, is continually to carry onward the deposit in the course of its current, so that it performs the double office of increasing the collection at every successive tide, and of advancing from place to place the matter at its disposal. This process, and the law by which it was produced, were proved by the manner in which the materials of wrecks were conveyed along the shore, and the direction (always that of flood) in which the various forms of deposits are increased. Many well-authenticated instances of the transportation of wrecked matter were adduced.” He adds, “It is difficult, if not impossible, to make these inquiries through another person with a perfectly intelligible result, * * * it has not, therefore, been possible to add many facts to those already collected. The following statements are well attested.”

Mr. J. H. Skillman, Inspector of the Port at Greenport, L. I., stated that in October, 1842, the whale-ship *Plato* was wrecked on the south side of Long Island, and he took part in the purchase of the wreck. “After removing the oil, the upper frame separated from the lower timbers and drifted to the westward. The wreck masters built a house on the beach, in which they lived two weeks, employed in rescuing the cargo and materials of the vessel. During this time bricks (spare ones for the ‘try-works’) and wood drifted to the westward, and were collected on the beach in that direction only. Nothing was carried to the eastward. The top frame that had separated was heavy, water-logged, and weighed down with iron fastenings, it floated deep; and at the time of its drifting to the westward, the wind was blowing from the west. The bricks and fire-wood constantly advanced in a westerly direction. During three of the fourteen days passed by the wreckers on the beach, the wind was from the north-west and one day very strong; at no time did it blow from the east. After the hull was lightened it began to work to the westward, so that it was necessary to secure it by ropes, made fast to stakes driven into the sand.”

Mr. Bishop, speaking of the British sloop-of-war *Sylph*, lost on the south side of Long Island in 1814-15, said that: “The materials of this wreck were also taken up to the westward, some of them beyond Fire Island beach during the three weeks following her destruction. And, curious to relate, her rudder was found seven years afterwards, twenty miles to the westward of the place of her loss. It was known by its size and the king’s arrow on the copper.” Other cases are cited, and the statement is made that the flood current on that part of the Long Island shore runs to the westward.

Lieut. Com’d’g J. N. Maffitt, U. S. Coast Survey, says: “Cape Hatteras is a point of divergence of the tide wave, or, in other words, a split of the tides takes place there; in consequence of which the advancing flood that supplies the harbor of Charleston flows along the coast from the

north to the south." He adds that, "the water, while it runs *flood*, is loaded with sand; but that, when it runs ebb, it contains little or none of this matter."

The action of the flood is to roll a floating body forward and lift it up, carrying it in the direction of the flood and finally leaving it stranded at high water.

"Again, if a strong wind should arise to cause a heavy sea upon the beach, the floating body will be thrown still farther on the shore." * * * "If, during the ebb tide, a floating object be placed upon the water, outside of the line at which the sea breaks, it will be taken off, but if inside the breakers, it will be cast upon the shore. From these facts it appears that there is a mechanical action, by means of which the water, when in contact with the shore, ejects the substances either floating upon its surface or held by it in suspension, and that the effect of the flood current is to transport these substances and place them within the reach of this action, and that of the ebb is to transport these substances beyond the reach of this action. That is to say, what is called the law of deposit of the flood tide may be divided into two distinct phenomena; one of which is the transporting power of the flood current towards and on to the shore; the other, the dynamical action of the water at the shore."

"So, then, the inward tendency of the wave action on the shore ejects or rejects the matters brought under its influence, and the transporting power of the flood current bears them from place to place, bringing them finally under this influence. And further, the projected particle will not strike the beach perpendicularly to its length, but obliquely, so that it will advance, as it rises on the shore; and in this manner, also, the combined action of the two forces leads to the accumulation of deposits in the direction of the flood tide."

In the *Mémoires*, American Academy of Arts and Sciences (New Series, Vol. iv), pages 138, *et seq.*, the same author cites a number of instances of wrecks along the south shore of Nantucket, and remarks: "In none of the instances were any of the wrecked materials seen to the westward of the spot where they first struck the island; that is, in the direction of the ebb. This is well known to be universally the case, so that wreckers never go to the westward, but always to the eastward in searching for floating articles. The fact is the more striking, that this course is opposed to the violent north-east gales, the principal cause of loss to shipping. For the preceding details I am indebted to Mr. Mitchell, of Nantucket, the astronomer," and others. "But the characteristic action of the flood may be observed with even greater distinctness on the eastern shore of Cape Cod. There is a separation or split of the tides * * * and the tide currents, at this place, appear to run on and off shore. Now, the materials of vessels that are wrecked to the southward of the seat of division of the tides are uniformly carried south, and are found inside of Chatham harbor or of Monomoy Point; while vessels that are wrecked so far north as to be within reach of the northern current of the flood have their effects

scattered along the north shore, and making occasionally the entire circuit of Cape Cod, are soon deposited in Provincetown harbor. Here also, as at Nantucket, the movement is opposite to the prevailing winds. The transportation of such heavy materials as coal and bricks has been mentioned."

Mr. Small, the keeper of the light at Truro, said that "When articles float light upon the water, and offer a large body to the resistance of the wind, they may during the violence of the storm be carried against the current. During seven-eighths of the time, the waves break on the shore at Truro in a direction to the northward of west, the shore itself running north and south. This takes place in *opposition* to northerly winds. If these winds are exceedingly strong, they may for a short time overcome this prevailing tendency. It is the same on the eastern shore of Sandy Hook and of Nantucket. As the flood tide runs in a northerly direction at each of these places, the idea is suggested that there is an intimate connection between the course of the current and the manner of approach of the waves to the beach." * * * "The constructive process of the flood is equally exhibited in the way in which the hooks, etc., are built up. They extend and increase always in the direction of the advancing current, as, for example, the Great Point of Nantucket gains constantly to the north, and the point of Monomoy to the south, which are the directions of the flood currents at these places. * * * And so with all the hooks, both great and small, of the north-eastern coast, whether formed on the borders of the sea or in enclosed bays and harbors."

Hitherto the *tides* have been regarded chiefly as an astronomical problem; but if the views brought forward in this memoir are correct, they must hereafter be treated also as a strict geological problem. It has been shown that the courses of the tidal currents must in general be due to the forms of the shores" (page 148). "In this memoir, the forms, localities and amounts of the alluvial deposits have been attributed to the active influence of local currents."

Notes on the Botocúdis and their Ornaments.

By Prof. John C. Branner.

(Read before the American Philosophical Society, November 16, 1888.)

The Botocúdis of Brazil have been described at more or less length by Prince Maximilien,* Auguste de St. Hilaire,† Lery,‡ Denis,§ Bigg-

* Voyage au Brésil, par S. A. S. Maximilien (French translation from the original German). Vol. ii, p. 207 et seq.

† Voyage dans les provinces de Rio de Janeiro et de Minas Geraes, par Auguste de St. Hilaire, 2 vols.

‡ Histoire d'un voyage fait en la terre du Brésil, par Jean de Lery, p. 108-1.

§ Brésil, par Ferdinand Denis. This work reproduces five plates of these Indians.

Wither,* Professor Hartt† and others, but nowhere have such carefully-made drawings been published of them as the accompanying, for none of the illustrations give any idea of the true features of these people. The photographs from which these are made were taken by M. Marc Ferrez, of Rio de Janeiro, in 1876, when he was employed as the photographer on the Brazilian Geological Survey. A leveling rod (metric system) was placed beside the subject in some cases for the purpose of affording an approximate measure. The short horizontal bands running part of the way across the rod are one centimetre wide.

These Indians live near the Rio Doce, about three hundred miles north-east of Rio de Janeiro. They are, or were but a short time ago, savages, and were formerly regarded as the most ferocious and intractable of all Brazil.‡ They wear but little clothing; their hair is very black and coarse, and their color a light mulatto. The women do not allow their hair to grow upon any part of the body except the head, and in the illustrations it may be noticed that they have no eyebrows, the hairs all having been pulled out. The children are dirt-eaters.

One of the most striking habits of these people is shown in the pictures—the wearing in the lips and ears as ornaments of great plugs resembling big, broad bottle-stoppers. As far as these pictures show the custom, the ear-plugs seem to be worn by both men and women, but only the women appear to wear them in the lips. The accounts given by Maximilien show that this custom was not so restricted at the time of his visit in 1836.

The openings for these ornaments (for that of course is what they are meant to be) are made by first piercing the ear or lip of the child when seven or eight years old with a small thorn or wooden spit of some kind, just as the ears are pierced nowadays among some civilized people, and a small stick is inserted in the opening. In a short time a larger stick is inserted, and as the opening yields to pressure, still larger sticks or plugs are used until the desired size is attained.

The lip ornament is made of a light kind of wood, is usually about two inches across (Prince Maximilien measured one over four inches in diameter), three-quarters of an inch thick, and with a groove about it in which the flesh-band fits, holding it in place. The lips of the younger people stand out at right angles or are somewhat elevated at the exterior margin, but with age the muscles relax, the openings enlarge, and the lips dangle. When the wearer smiles broadly the projecting ornament rises, and if it fits tightly, strikes the end of the nose. This ornament is worn almost all the time, though it is occasionally taken out. When these lip-plugs are removed the loops of flesh hang down in the most ungraceful manner imaginable, and are often torn out in the family jars that occur even in savage life. So great is the attachment of the women to their lip-orna-

* Pioneering in South Brazil, by Thomas Bigg-Wither, Vol. II.

† Geology and Physical Geography of Brazil, by Ch. Fred. Hartt. Appendix, p. 577 et seq.

‡ Southey's History of Brazil.

ments, that when one of them gets the flesh-band broken, she patches the ends together with strings that she may not be without her ornaments. This breaking and mending are shown in illustrations 4, 5 and 7, while in 3 and 6 the bands are shown unbroken. Lery says they used to take the plugs from these openings and thrust their tongues through them in order to give the impression that they had two mouths. He adds: "I leave you to judge whether they are handsome in this act." One cannot help thinking that St. Hilaire was in a waggish mood when he wrote of these people that "Ils se distinguent surtout par une physionomie plus ouverte." than the other Indians of Minas.* The use of these heavy lip-ornaments appears to have affected the language of these people, for it is remarkably guttural and nasal, and has no labial sounds.

When the ear-rings or ear-plugs are lost or removed, the bands of flesh dangle near the shoulders, as may be seen in 2 and 8, and are, on account of the danger of being broken or torn when thus left exposed, generally looped over the tops of the ears. This is shown in 3, 6 and 7. In 4 the ear-opening is not fashionably large. The lip and ear-ornaments of South American Indians are not always made of plain wood and in this bungling, bottle-stopper shape, the custom varying more or less among the widely scattered tribes. Some of them use pendants smaller in diameter, but of greater length, while some of them are made with the greatest care, and of the most beautiful stones. In the Museu Nacional at Rio de Janeiro are many of these more beautiful lip and ear ornaments made of beryl, jade, serpentine, quartz, clay and wood.† Bigg-Wither figures one large spindle-shaped lip-ornament from Southern Brazil weighing a quarter of a pound.‡

The use of these monstrous plugs is gradually dying out among the Botocúdu. It is to be noticed, even in these illustrations, that the younger members of the tribe do not wear them, and in the case of number 10 the young woman wears ear-pendants very like those used among the more civilized races of the present day.

No. 9 is introduced to show the method used by the people to carry children. The same method is employed in carrying other burdens. It shows also the method of wearing the dress, which is usually nothing more than a strip of cloth, but which is sometimes sewed together at the ends.

Under the encroaching influences of civilization, the savage customs of these tribes are gradually disappearing.

*Southey's History of Brazil, Vol. II, p. 151.

†Archivos do Museu Nacional, Vol. VI, 1885, Plate VIII.

‡Op. cit., p. 142.

Stated Meeting, January 4, 1889.

Present, 26 members.

President, Mr. FRALEY, in the Chair.

Correspondence was submitted as follows: A letter was read from Mr. Arthur Biddle acknowledging his election as a member of the Society.

A letter was read from Bishop Crescencio Carillo, of Merida, Yucatan, acknowledging the receipt of his diploma.

Letters of envoy were received from the Meteorological Office, London; J. C. Ayer & Co., Lowell, Mass.

Letters of acknowledgment for Transactions XVI, 2, were received from the Société R. de Zoologie, "Natura Artis Magistra," Amsterdam; Philosophical Society, Cambridge, England; Royal Society, Royal Institution, R. Astronomical Society, Society of Antiquaries, London; Radcliffe Observatory, Oxford.

Letters of acknowledgment for Proceedings were received from the Societas pro Fauna and Flora Fennica, Helsingfors (127); Phys. Cent. Observatory (127); Académie R. des Sciences, Lisbonne (125, 126, 127); Royal Statistical Society, London (126, 127); Dr. Brezina (126, 127).

Accessions to the Library were received from the Linnean Society of New South Wales, Sydney; Mr. John Tebbutt, Windsor, N. S. W.; Societas pro Fauna et Flora Fennica, Helsingfors; K. K. Geologische Reichsanstalt, Wien; Gesellschaft für Erdkunde, Physiologische Gesellschaft, "Naturwissenschaftliche Wochenschrift," Berlin; Gartenbauverein, Darmstadt; Naturwissenschaftlicher Verein des Reg. Bez., Frankfurt, a. O.; Société R. de Zoologie, "Natura Artis Magistra," Amsterdam; Biblioteca N. C., Firenze; R. Accademia de Scienze,

etc., Modena; R. Istituto Lombardo, Milan; R. Comitato Geologico d'Italia, Biblioteca N. C. V. E., Rome; Société Philologique, Alençon; Société de Borda, Dax; Société de L'Enseignement, Rédaction "Cosmos," Paris; R. Astronomical Society, R. Geographical Society, Meteorological Council, Editors of "Nature," London; American Statistical Association, Boston; Harvard College Observatory, Museum of Comparative Zoölogy, Dr. Samuel Abbott Green, Cambridge, Mass.; Dr. J. C. Ayer, Lowell; R. I. Historical Society, Providence; "American Journal of Science," New Haven; N. Y. State Museum, Albany; Drs. Charles W. Dulles, I. Minis Hays, Mr. Henry Phillips, Jr., Philadelphia; Johns Hopkins University, Maryland Academy of Sciences, Baltimore; Department of State, Hydrographic Office, Mr. F. L. Scribner, Washington.

The President reported that he had appointed as the committee to examine the paper of George B. Simpson, Messrs. Lesley, Horn and Heilprin.

Prof. Lesley, Chairman of the Committee on Mr. Simpson's paper, reported it worthy of publication, and it was referred to the Committee on Publication.

The President reported that he had appointed as the Standing Committee on the Henry M. Phillips' Prize Essay Fund, Mr. Richard Vaux, Chairman, Messrs. Henry Phillips, Jr., William V. McKean, Furman Sheppard, and Joseph Fraley.

The Committee on the Aztec MSS. reported progress, and was continued.

The Committee on the International Language reported progress and was continued, and, on motion, Mr. Horatio Hale was requested to prepare a historical digest of schemes for a universal language to be printed and distributed by the Society in advance of the meeting of the Congress it proposes to convene.

The death of Prof. Josef von Lenhossek (Budapest, December 2, 1888, æt. 71) was announced.

The judges and clerks of the election reported the following gentlemen as having been elected :

President.

Frederick Fraley.

Vice-Presidents.

E. Otis Kendall, W. S. W. Ruschenberger, J. P. Lesley.

Secretaries.

George F. Barker, Daniel G. Brinton, Henry Phillips, Jr.,
George H. Horn.

Counsellors (for three years).

Richard Wood, William V. McKean, Isaac C. Martindale,
Richard Vaux.

*Counsellor for two years in place of Dr. J. Cheston Morris,
resigned.*

Samuel Wagner.

Curators.

John R. Baker, Patterson DuBois, J. Cheston Morris.

Treasurer.

J. Sergeant Price.

Mr. Henry Phillips, Jr., was renominated for Librarian for the ensuing year, and, on motion, the nominations were closed.

Prof. Cope presented a paper for the Transactions on "The Mechanical Causes of the Character of the Hard Parts of the Mammalia," which was, on motion, referred to a committee of three (to be appointed by the President) to examine. The President subsequently appointed as such committee, Drs. Joseph Leidy, Harrison Allen, and Horace Jayne.

The Committee on Finance reported the annual appropriations, which were adopted.

Prof. Lesley made a communication in reference to the condition and progress of the U. S. Coast Survey, and offered a preamble and resolution, all of which, after discussion, was referred to the President of the Society and Messrs. Dudley, Frazer and Haupt as a committee, to report upon at the next meeting of the Society.

And the Society was adjourned by the President.



FIG. 1.



FIG. 2.



FIG. 3.

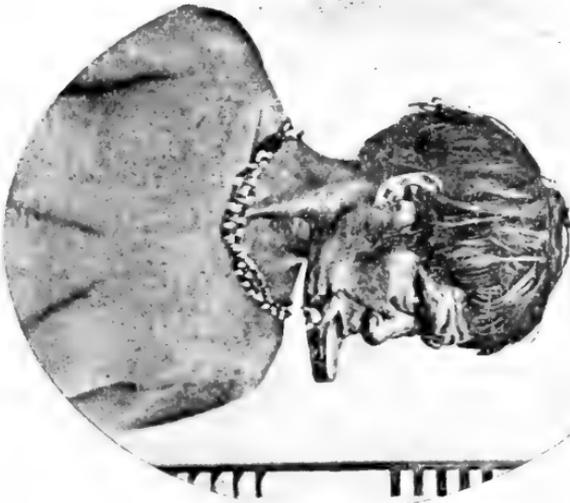


FIG. 4.



FIG. 5.

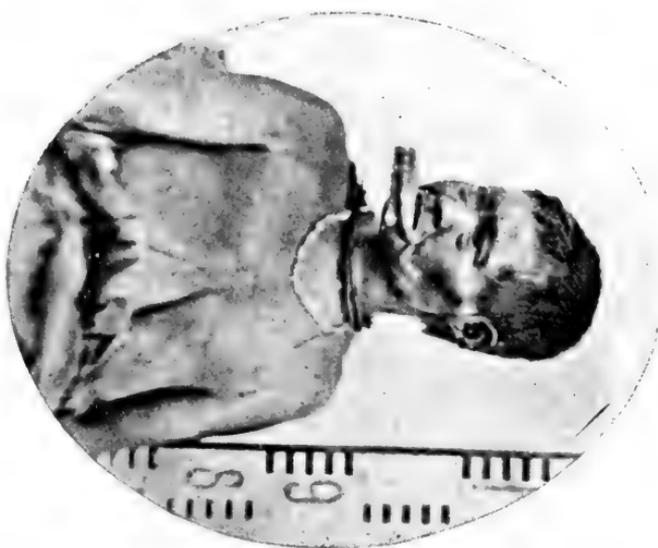


FIG. 6.

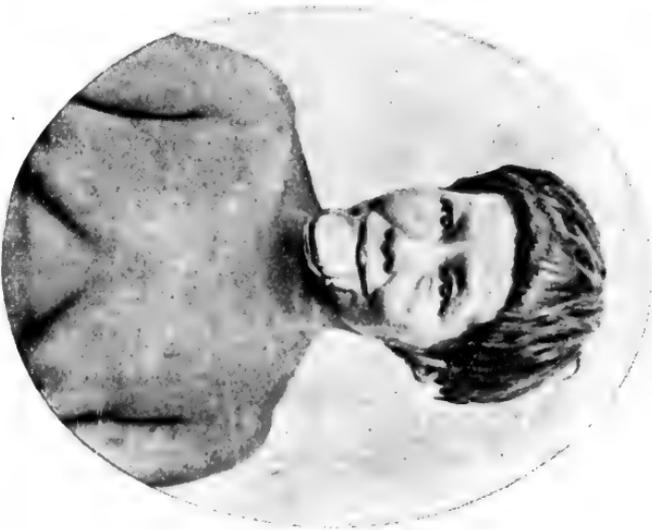


FIG. 7.



FIG. 8.

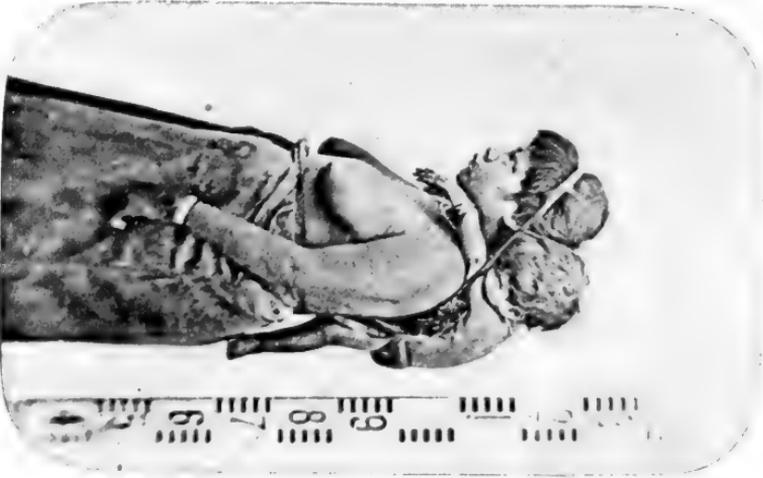


FIG. 9.



FIG. 10.



The Ta Ki, the Svastika and the Cross in America.

By Daniel G. Brinton, M.D.

(Read before the American Philosophical Society, December 21, 1888.)

What I am about to say is, to a certain degree, polemical. My intention is to combat the opinions of those writers who, like Dr. Hamy, M. Beauvois and many others,* assert that, because certain well-known Oriental symbols, as the Ta Ki, the Triskeles, the Svastika and the Cross, are found among the American aborigines, they are evidence of Mongolian, Buddhistic, Christian or Aryan immigrations, previous to the discovery by Columbus; and I shall also try to show that the position is erroneous of those who, like William H. Holmes, of the Bureau of Ethnology, maintain that "it is impossible to give a satisfactory explanation of the religious significance of the cross as a religious symbol in America."†

In opposition to both these views I propose to show that the primary significance of all these widely extended symbols is quite clear; and that they can be shown to have arisen from certain fixed relations of man to his environment, the same everywhere, and hence suggesting the same graphic representations among tribes most divergent in location and race; and, therefore, that such symbols are of little value in tracing ethnic affinities or the currents of civilization.

Their wide prevalence in the Old World is familiar to all students. The three legs diverging from one centre, which is now the well-known arms of the Isle of Man, is the ancient *Triquetrum*, or, as Olshausen more properly terms it, the *Triskeles*,‡ seen on the oldest Sicilian coins and on those of Lycia, in Asia Minor, struck more than five hundred years before the beginning of our era. Yet such is the persistence of symbolic forms, the traveler in the latter region still finds it recurring on the modern

* Dr. E. T. Hamy, *An Interpretation of one of the Copan Monuments*, in *Journal of the Anthropological Institute*, February, 1887; also, *Revue d'Ethnographie*, 1886, p. 233; same author, *Le Svastika et la Roue Solaire en Amérique*, *Revue d'Ethnographie*, 1885, p. 22. E. Beauvois, in *Annales de Philosophie Chrétienne*, 1877, and in various later publications. Ferraz de Macedo, *Essai Critique sur les Ages Préhistoriques de Brésil*, Lisbon, 1887, etc.

† See his article, "Art in Shell of the Ancient Americans," in *Second Annual Report of the Bureau of Ethnology*, p. 270.

‡ See his article in *Zeitschrift für Ethnologie*, 1886, p. 223.

felt wraps used by the native inhabitants.* As a decorative motive, or perhaps with a deeper significance, it is repeatedly found on ancient Slavic and Teutonic vases, disinterred from mounds of the bronze age, or earlier, in Central and Northern Europe. Frequently the figure is simply that of three straight or curved lines springing from a central point and surrounded by a circle, as :



Fig. 1.



Fig. 2.

In the latter we have the precise form of the Chinese Ta Ki, a symbolic figure which plays a prominent part in the mystical writing, the divination and the decorative art of China.†

As it is this symbol which, according to Dr. Hamy, the distinguished ethnologist and Director of the Museum of the Trocadero, Paris, indicates the preaching of Buddhistic doctrines in America, it merits close attention.

The Ta Ki, expressed by the signs :



Fig. 3.

is properly translated, "The Great Uniter" (*ta*, great ; *ki*, to join together, to make one, to unite), as in modern Chinese philosophy, expressed in Platonic language, the One as distinguished from the Many, and is regarded as the basis of the numerical system. But as the Chinese believe in the mystic powers of numbers, and as that which reduces all multiplicity to unity naturally controls or is at the summit of all things, therefore the Ta Ki expresses the completest and highest creative force.

* Von Luchan, in *Zeitschrift für Ethnologie*, 1886, s. 301.

† See Dumoutier, *Le Svanika et la Roue Solaire en Chine*, in *Revue d' Ethnologie*, 1885, p. 333, sq.

As in Chinese philosophy, the Universe is made up of opposites, heaven and earth, light and darkness, day and night, land and water, concave and convex, male and female, etc., the highest terms for which are *Yin* and *Yang*; these are held to be brought into fructifying union by *Ta Ki*. Abstractly, the latter would be regarded as the synthesis of the two universal antitheses which make up all phenomena.*

The symbolic representation of *Yin* and *Yang* is a circle divided by two arcs with opposite centres, while the symbol of *Ta Ki* adds a third arc from above uniting these two.



Fig. 4.



Fig. 5.

It is possible that these symbols are of late origin, devised to express the ideas above named. One Chinese scholar (Mr. S. Culin) tells me that it is doubtful if they occur earlier than the twelfth century, A. D., and that they were probably introduced for purposes of divination. In this case, I believe that they were introduced from the South, and that they originally had another and concrete significance, as I shall explain later.

Others consider these symbols as essentially Mongolian. The *Ta Ki* or *Triskeles* is to them the Mongolian, while the *Svastika* is the ethnic Aryan symbol. Such writers suspect Indo-European immigration where they discover the latter, Chinese immigration where they find the former emblem.

The *Svastika*, I need hardly say, is the hooked cross or gam mated cross, usually represented as follows :



Fig. 6.

the four arms of equal length, the hook usually pointing from left to right. In this form it occurs in India and on very early (neo-

* I am indebted for some of these explanations to Mr. K. Sungimoto, an intelligent Japanese gentleman, well acquainted with Chinese, now resident in Philadelphia.

lithic) Greco-Italic and Iberian remains. So much has been written upon the Svastika, however, that I need not enter upon its archæological distribution.

Its primary significance has been variously explained. Some have regarded it as a graphic representation of the lightning, others as of the two fire-sticks used in obtaining fire by friction, and so on.

Whatever its significance, we are safe in considering it a form of the Cross, and in its special form obtaining its symbolic or sacred association from this origin.

The widely-spread mystic purport of the Cross symbol has long been matter of comment. Undoubtedly in many parts of America the natives regarded it with reverence anterior to the arrival of Europeans; as in the Old World, it was long a sacred symbol before it became the distinctive emblem of Christianity.

As in previous writings I have brought together the evidence of the veneration in which it was held in America, I shall not repeat the references here.

I believe we may go a step further and regard all three of these symbols, the Ta Ki or Triskeles, the Svastika and the Cross as originally the same in signification, or, at least, closely allied in meaning. I believe, further, that this can be shown from the relics of ancient American art so clearly that no one, free from prejudice, and whose mind is open to conviction, will deny its correctness.

My belief is that all of these symbols are graphic representations of the movements of the sun with reference to the figure of the earth, as understood by primitive man everywhere, and hence that these symbols are found in various parts of the globe without necessarily implying any historic connections of the peoples using them.

This explanation of them is not entirely new. It has previously been partly suggested by Profs. Worsaae and Virchow; but the demonstration I shall offer has not heretofore been submitted to the scientific world, and its material is novel.

Beginning with the Ta Ki, we find its primary elements in the symbolic picture-writing of the North American Indians. In

that of the Ojibways, for example, we have the following three characters :



Fig. 7.



Fig. 8.



Fig. 9.

Of these, the Fig. 7 represents the sunrise ; Fig. 9, sunset ; Fig. 8, noonday. The last-mentioned is the full day at its height.* Where, in rock-writing or scratching on wood, the curve could not conveniently be used, straight lines would be adopted :



Fig. 10.

thus giving the ordinary form of the *Triskeles*. But the identical form of the *Ta Ki* is found in the calendar scroll attached to the *Codex-Poinsett*, an unpublished original Mexican MS., on agave paper, in the library of the American Philosophical Society. A line from this scroll is as follows :



Fig. 11.

Here each circle means a day, and those with the *Triskeles*, culminating days.†

* George Copway, *Traditional History of the Ojibway Nation*, p. 134. It will be noted that in the sign for sunrise the straight line meets the curve at its *left* extremity, and for sunset at its *right*. This results from the superstitious preference of facing the south rather than the north.

† The triplicate constitution of things is a prominent feature of the ancient Mexican philosophy, especially that of Tezcuco. The visible world was divided into three parts, the earth below, the heavens above, and man's abode between them. The whole was represented by a circle divided into three parts, the upper part painted blue, the lower brown, the centre white (see Duran, *Historia*, Lam. 15^a, for an example). Each of these three parts was subdivided into three parts, so that when the Tezcucan king built a tower as a symbol of the universe, he called it "The Tower of Nine Stories" (see my *Ancient Nahuall Poetry*, Introduction, p. 36).

Another form of representing days is seen in the Vatican Mexican Codex published in Kingsborough's *Mexico*, Vol. iii:



Fig. 12.

This is not far from the figure on the stone at Copan, described in Dr. Hamy's paper, where the design is as follows:

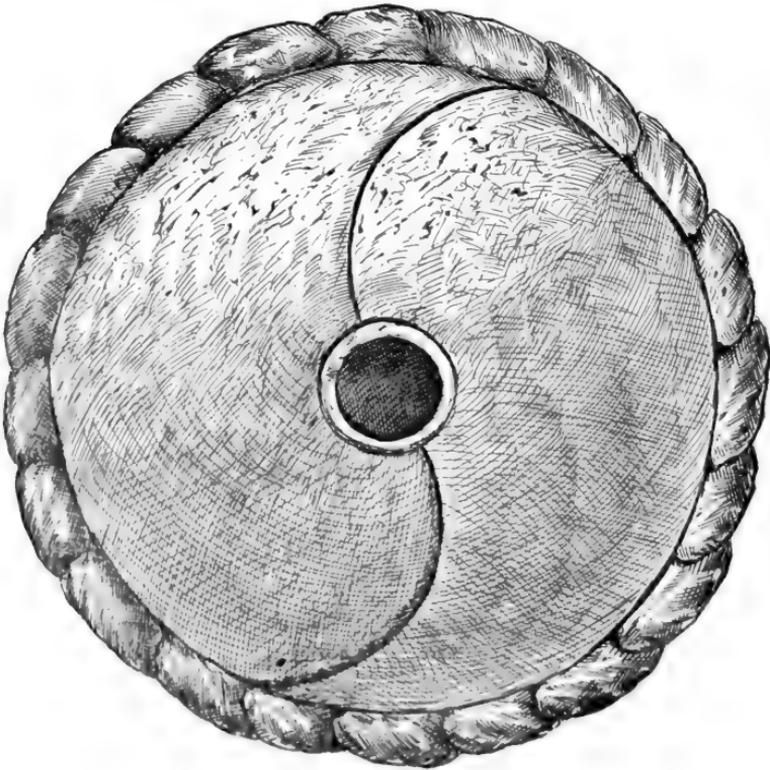


Fig. 13.

This does not resemble the Ta Ki, as Dr. Hamy supposes, but rather the Yin-Yang; yet differs from this in having a central circle (apparently a cup-shaped depression). This central circular figure, whether a boss or nave, or a cup-shaped pit, has been explained by Worsaae as a conventionalized form of the sun, and

in this he is borne out by primitive American art, as we shall see. The twenty elevations which surround the stone, corresponding in number to the twenty days of the Maya month, indicate at once that we have here to do with a monument relating to the calendar.

Turning now to the development of this class of figures in primitive American art, I give first the simplest representations of the sun such as those painted on buffalo skins by the Indians of the Plains, and scratched on the surface of rocks. The examples are selected from many of the kind published by Col. Garrick Mallery.*

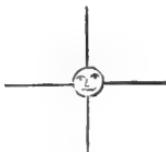


Fig. 14.

The design is merely a rude device of the human face, with four rays proceeding from it at right angles. These four rays represent, according to the unanimous interpretation of the Indians, the four directions defined by the apparent motions of the sun, the East and West, the North and South. By these directions all travel and all alignments of buildings, corpses, etc., were defined; and hence the earth was regarded as four-sided or four-cornered; or, when it was expressed as a circle, in accordance with the appearance of the visible horizon, the four radia were drawn as impinging on its four sides:

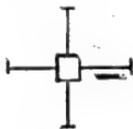


Fig. 15.



Fig. 16.

Fig. 15 is a design on a vase from Marajo, Brazil, and is of common occurrence on the pottery of that region.† Fig. 16 repre-

* Mallery, *Pictography of the North American Indians*, in *Fourth Annual Report of the Bureau of Ethnology*, p. 239.

† Dr. Ferraz de Macedo, *Essai Critique sur les Ages Prehistorique de Bresil*, p. 38 (Lisbonne, 1857).

sents the circle of the visible horizon, or the earth-plain, with the four winds rushing into it when summoned by a magician. It is a figure from the Meday magic of the Ojibways.* Dr. Ferraz de Macedo has claimed that such devices as Fig. 16 “show Chinese or Egyptian inspiration.”† It is certainly unnecessary to accept this alternative when both the origin and significance of the symbol are so plain in native American art.

When the symbol of the sun and the four directions was inscribed within the circle of the visible horizon, we obtain the figure representing the motions of the sun with reference to the earth as in :



Fig. 17.

This is what German archæologists call the wheel-cross, *Radkreuz*, distinguished, as Worsaae pointed out, by the presence of the central boss, cup or nave, from the ring-cross, *Ringkreuz*, Fig 18 :



Fig. 18.



Fig. 19.

in which, also, the arms of the cross do not reach to the circumference of the wheel. Worsaae very justly laid much stress on the presence of the central boss or cup, and correctly explained it as indicative of the sun; but both he and Virchow, who follows him in this explanation, are, I think, in error in supposing that the circle or wheel represents the rolling sun, *die rollende Sonne*. My proof of this is that this same figure was a familiar symbol, with the signification stated, in tribes who did not know

* *Captivity and Adventures of John Tanner*, pp. 359, 360.

† *Op. cit.*, p. 38.

the mechanical device of the wheel, and could have had, therefore, no notion of such an analogy as the rolling wheel of the sun.*

When applied to time, the symbol of the circle in primitive art referred to the return of the seasons, not to an idea of motion in space. This is very plainly seen both in art and language. In the year-counts or winter-counts of the American tribes, the years were very generally signified by circles arranged in rows or spires. Fig. 20 shows the Dakota winter-count, as depicted on their buffalo robes.†



Fig. 20.

This count is to be read from right to left, because it is writ-

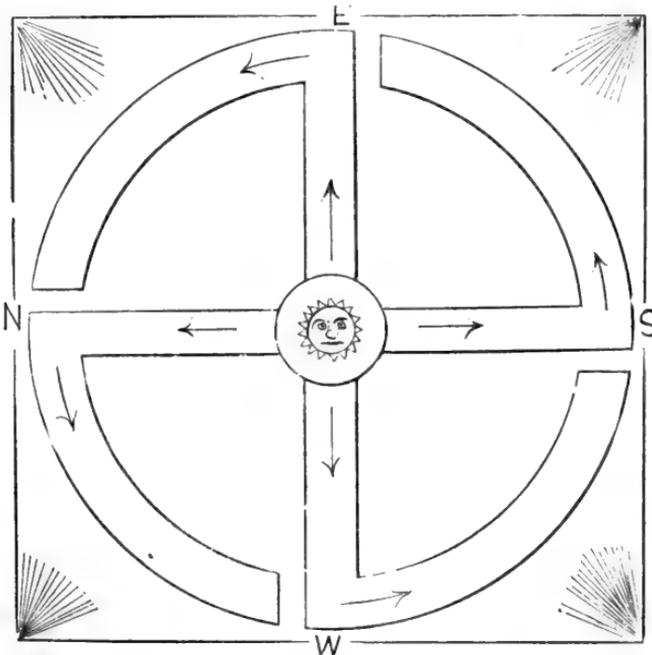


Fig. 21.

* See Worsaae, *Danish Arts*, and Virchow, in various numbers of the *Zeitschrift für Ethnologie*. The ring-cross is a common figure in American symbolism and decorative art. It frequently occurs on the shields depicted in the Bologna Codex, and the two codices of the Vatican (Kingsborough's *Antiquities of Mexico*, Vols. ii and iii). Dr. Ferraz de Macedo says that the most common decorative design on both ancient and modern native Brazilian pottery is the ring-cross in the form of a double spiral, as in Fig. 19 (*Essai Critique sur les Ages Préhistorique de Bresil*, p. 40). A very similar form will be found in the Bologna Codex, pl. xviii, in Kingsborough's *Mexico*, Vol. ii.

† See Mallery, *Pictography of the North American Indians*, pp. 88, 89, 128, etc.

ten from left to right, and hence the year last recorded is at the end of the line.

Precisely similar series of circles occur on the Aztec and Maya codices with the same signification. Moreover, the year-cycles of both these nations were represented by a circle on the border of which the years were inscribed. In Maya this was called *uazlazon katun*, the turning about again, or revolution of the katuns.*

The Aztec figure of the year-cycle is so instructive that I give a sketch of its principal elements (Fig. 21), as portrayed in the atlas to Duran's History of Mexico.†

In this remarkable figure we observe the development and primary signification of those world-wide symbols, the square, the cross, the wheel, the circle, and the svastika. The last-mentioned is seen in the elements of the broken circle, which are:



Fig. 22.

which conventionalized into rectilinear figures, for scratching on stone or wood, became:



Fig. 23.

In the Mexican time-wheel, the years are to be read from right to left, as in the Dakota winter-counts; each of the quarter circles represent thirteen years; and these, also, are to be read from right to left, beginning with the top of the figure, which is the East, and proceeding to the North, South and West, as indicated.

The full analysis of this suggestive and authentic astronomical figure will reveal the secret of most of the rich symbolism and mythology of the American nations. It is easy to see how from it was derived the Nahuatl doctrine of the *nahua ollin*, or Four

* This name is given in Landa, *Relacion de las Cosas de Yucatan*, p. 313.

† *Historia de la Nueva Espana*, Trat. III, cap. I.

Motions of the Sun, with its accessories of the Four Ages of the World. The Tree of Life, so constantly recurring as a design in Maya and Mexican art, is but another outgrowth of the same symbolic expression for the same ideas.

That we find the same figurative symbolism in China, India, Lycia, Assyria and the valley of the Nile, and on ancient urns from Etruria, Iberia, Gallia, Sicilia and Scythia, needs not surprise us, and ought not to prompt us to assert any historic connection on this account between the early development of man in the New and Old World. The path of culture is narrow, especially in its early stages, and men everywhere have trod unconsciously in each other's footsteps in advancing from the darkness of barbarism to the light of civilization.

Grammatic Notes and Vocabulary of the Pennsylvania German Dialect.

By W. J. Hoffman, M.D., Washington, D.C.

(Read before the American Philosophical Society, December 21, 1888.)

It is an astonishing fact that the speech of over three quarters of a million people, occupying the most fertile agricultural lands of Eastern Pennsylvania, has, with few unimportant exceptions, received almost no attention from a scientific and philological standpoint. It is not the intention of the writer to venture upon the subject from these points of view, but only to present a few brief facts respecting the grammatic and phonetic peculiarities of the "Pennsylvania German" dialect, and to give a vocabulary of such words as are at present employed by such of them as are not familiar with any other language.

It is the writer's intention to present here a simple and intelligible system of orthography, so that the exact sounds of syllables and words may readily be reproduced by any one not familiar with them. This has not been accomplished in the several brief contributions which have appeared at sundry times and in various places, excepting in the case of a few essays which were of strictly philologic value, but which, unfortunately, abound in inverted letters and diacritical marks, thus causing a practical study thereof to become rather difficult and tedious.

The alphabet employed in the present paper and vocabulary is practically that adopted by the Bureau of Ethnology, at Washington, D.C.

A slight departure from that, even, has been found advisable, so as to secure the simplest phonetic system without introducing characters foreign to the English language.

It is well known that the early German colonists represented almost every dialectic subdivision of the States now embraced within the empires of Germany and Austro-Hungary, but as the immigrants from the Rhenish Palatinate were in excess, the present linguistic residuum partakes more of the characteristics of the Pfalz dialects than those of any other. This fact was most forcibly brought to the writer's attention during the period of his services as Staff-Surgeon in the Prussian army, in 1870-71, at which time opportunities for practical comparison occurred almost daily.

The chief difference between the Pennsylvania dialect, and those of the Rhenish Palatinate, lies in the fact that the former is characterized by the abundance of nasalized terminal vowel sounds, brought about by the almost unvarying rule of dropping the final *n* of German words ending in *en* and *ein*, and sounding the vowel as *ä* or *e*, or *äⁿ* or *eⁿ*. This has reference particularly to verbs in which the infinitive final is *en* in the German.

It is extremely difficult for the people of the rural districts, who are not familiar with the English language, to acquire the correct sound of *j* as in James, and of *g* as in gem; the result is *ts^h* or *ch^h* as in chain; words, on the contrary, beginning with *ch^h*, as in Charles, are pronounced like *j*, as in jar.

The final *th* usually becomes *s*, while the same sound as an initial one becomes *d*; this applies to English words, incorporated with the Pennsylvania German.

Both German and English words commencing with *st*, *sl*, *sw*, *sm*, *sn*, *sp*, etc., are pronounced as if written with *sh*, the *h* being inserted between the first two consonants, e. g., *stein* = *shteⁿ*; *slow* = *shlō*; *small* = *shmâl*.

Plurals, and diminutives, are formed after the same manner as in German.

The following alphabet will serve to represent the words of this dialect, as it is spoken chiefly in the northern portions of Berks, Lehigh, and Northampton counties. On account of local peculiarities, a drawling manner, or a rapidity of speech, inhabitants of the several localities can often be readily identified:

a as in *what, was*; German, *man*.

ä as in *car, far*.

ä as in *hat, mat, mass*.

â as in *law, ball*.

ai as in *aisle*; as *i* in *pine*; used in the present work instead of the German *oi, ein, sein* = *ain, sain*.

âi as *oi* in *oil, boil*. Ex. *hâi* = hay; *Mâi* = May.

au as *ou* in *out, or ow* in *owl*; German, *kraut, laus*.

b as in *ball, bulb*.

- c* see explanation under *ts* and *tsh*.
ch as in German *nicht, licht, nich*.
d as in *dead, deal*.
e short sound of English *a*, as *bet, pet*.
ē long sound of English *a*, as in *ale*.
f as in *fifty, fib*.
g as in *gag*; German, *gabe*.
gh as in *tage*, or in the last syllable of *dagegen*.
h as in *hold, hat*.
i short sound of the English *e*, as in *hit, bit*.
ī long sound of the English *e*, as in *beet, i* in *pique*; German, *ihm*.
j as in *just, judge*.
k as in *kick, kill*.
l as in *lull*.
m as in *man, mum*.
n as in *no, none*.
o short sound as in the German *soll, holz*.
ō long sound as in *most, note, pole*.
p as in *pip, pulp*.
q is represented by *k*.
r as in *run, roar*.
s as in *sell, sold*.
t as in *tell, tuft*.
ts as the German *c* in *cedar* = *tsc'ler*, and *z* in *zeit* = *tsait*.
tsh as the English *ch* in *church, chin* = *tshortsh, tshin*.
u short sound as in *put, pull*.
ū long sound as in *rule*.
v as in *velvet, van*.
w as in *will, wish*.
x is represented by *ks*, as *ax* = *ä'ks*, *box* = *baks*.
y as in *you, yield*.
z as in *zeal, zest*.
ñj as in *sing, bring*.
' represents the omission of a vowel.
ⁿ nasalized vowels are indicated by the superior *n* as *aⁿ, iⁿ*.
- the hyphen is employed between syllables.
' the acute accent is employed to indicate accented syllables, as *ri'v'er*,
re-vere'.
äü duplication of vowels prolongs the sound of a short vowel, as *lä't*,
hä'ärt.

In German words ending in *be* or *ben*, the *b* becomes *w*, as *gabe* — *gäwä*; *geben* — *gë'wä*; and in many words the *au* becomes *ä* as *laufen* — *lä'ä*, *taufen* — *dä'ä*. The initial *t* in German generally becomes *d*.

The following notes will serve to further aid in the peculiarities of pronunciation and contraction of words :

Conjugation of the verb *tse saiⁿ*, *to be* :

INDICATIVE MOOD.

PRESENT TENSE.

<i>Singular.</i>		<i>Plural.</i>
1. ich bin		1. mir sin
2. du bisht		2. ir sin
3. är is		3. si sin

IMPERFECT TENSE.

(*Not used.*)

PERFECT TENSE.

1. ich wâr	1. mir wâ'ra
2. du wârsh't	2. ir wâ'ra
3. är wâr	3. si wâ'ra

PLUPERFECT TENSE.

1. ich wâr gewest'	1. mir wâ'ra gewest
2. du wârsh't gewest'	2. ir wâ'ra gewest'
3. är wâr gewest'	3. si wâ'ra gewest'

FIRST FUTURE TENSE.

1. ich sol sai ⁿ	1. mir sol'la sai ⁿ
2. du solsh't sai ⁿ	2. ir sol'la sai ⁿ
3. är sodt sai ⁿ	3. si sol'la sai ⁿ
1. ich wil sai ⁿ	1. mir wel'la sai ⁿ
2. du wid sai ⁿ	2. ir wel'la sai ⁿ
3. är wil sai ⁿ	3. si wel'la sai ⁿ

SECOND FUTURE TENSE.

1. ich sol gewest' sai ⁿ	1. mir sol'la gewest' sai ⁿ
2. du solsh't gewest' sai ⁿ	2. ir sol'la gewest' sai ⁿ
3. är sol gewest' sai ⁿ	3. si sol'la gewest' sai ⁿ

SUBJUNCTIVE MOOD.

PRESENT TENSE.

<i>Singular.</i>		<i>Plural.</i>
1. ich mâg sai ⁿ		1. mir mē'gha sai ⁿ
2. du mâgsh't sai ⁿ		2. ir mē'gha sai ⁿ
3. är mâg sai ⁿ		3. si mē'gha sai ⁿ

IMPERFECT TENSE.

Singular.

1. ich mēgt saiⁿ
2. du mēgsht saiⁿ
3. ār mēgt saiⁿ

Plural.

1. mir mēg'ta saiⁿ
2. ir mēg'ta saiⁿ
3. si mēg'ta saiⁿ

PERFECT TENSE.

1. ich mâg gewest' saiⁿ
2. du mâgsht gewest' saiⁿ
3. ār mâg gewest' saiⁿ

1. mir mē'gha gewest' saiⁿ
2. ir mē'gha gewest' saiⁿ
3. si mē'gha gewest' saiⁿ

PLUPERFECT TENSE.

1. ich mēgt gewest' saiⁿ
2. du mēgsht gewest' saiⁿ
3. ār mēgt gewest' saiⁿ

1. mir mēch'ta gewest' saiⁿ
2. ir mēch'ta gewest' saiⁿ
3. si mēch'ta gewest' saiⁿ

FIRST FUTURE TENSE.

1. ich wār saiⁿ
2. du wārsh^t saiⁿ
3. ār wārt saiⁿ

1. mir wā'ra saiⁿ
2. ir wā'ra saiⁿ
3. si wā'ra saiⁿ

CONDITIONAL MOOD.

FIRST CONDITIONAL.

1. ich sodt saiⁿ
2. du sodsht saiⁿ
3. ār sodt saiⁿ

1. mir sod'ta saiⁿ
2. ir sod'ta saiⁿ
3. si sod'ta saiⁿ

SECOND CONDITIONAL.

1. ich sedt gewest' saiⁿ
2. du sodsht gewest' saiⁿ
3. ār sodt gewest' saiⁿ

1. mir sed'ta gewest' saiⁿ
2. ir sod'ta gewest' saiⁿ
3. si sod'ta gewest' saiⁿ

IMPERATIVE MOOD.

- | | | | |
|------------------|---|-------------------------------|---------------------------------|
| <i>Singular.</i> | { | 1. <i>wanting.</i> | (Frequently pronounced sai-dä.) |
| | | 2. { sai du } (" " bish-dä.) | |
| | | 3. is ār, si or es | |
| <i>Plural.</i> | { | 1. sin mir or wir | |
| | | 2. sait (or sin) ir | |
| | | 3. sin (or sain) si | |

INFINITIVE MOOD.

PRESENT TENSE.

tse saiⁿ

PERFECT TENSE.

gewest' saiⁿ

FUTURE TENSE.

saiⁿ wā'rä

PARTICIPLES.

PRESENT.

sait ?

PERFECT.

gewest

Paradigm of a reflexive verb :

sich tsa shem'ma, to be ashamed of one's self :

INDICATIVE MOOD.

PRESENT TENSE.

Singular.

1. ich shem mich
2. du shemsht dich
3. är shemt sich

Plural.

1. mir shem'ma uns
2. ir shem'ma aich
3. si shem'ma sich

IMPERFECT TENSE.

(Not used.)

PERFECT TENSE.

1. ich hab mich gshemt
2. du hosht dich gshemt
3. är hot sich gshemt

1. mir hen uns gshemt
2. ir hen aich gshemt
3. si hen sich gshemt

PLUPERFECT TENSE.

1. ich het mich gshemt
2. du hetsht dich gshemt
3. är het sich gshemt

1. mir het'ten (*or* het'te) uns gshemt
2. ir het'ten " aich gshemt
3. si het'ten " sich gshemt

FIRST FUTURE TENSE.

1. ich wär mich shem'ma
2. du wärsht dich shem'ma
2. är wärdt sich shem'ma

1. mir wä'ra uns shem'ma
2. ir wä'ra aich shem'ma
3. si wä'ra sich shem'ma

SECOND FUTURE TENSE.

1. ich wär mich gshemt ha'wa
2. du wärsht dich gshemt ha'wa
3. är wärdt sich gshemt ha'wa

1. mir wä'ra uns gshemt ha'wa
2. ir wä'ra aich gshemt ha'wa
3. si wä'ra sich gshemt ha'wa

SUBJUNCTIVE MOOD.

PRESENT TENSE.

1. ich mäg mich shem'ma
2. du mägsht dich shem'ma
3. är mäg sich shem'ma

1. mir mē'gha uns shem'ma
2. ir mē'gha aich shem'ma
3. si mē'gha sich shem'ma

IMPERFECT TENSE.

Singular.

1. ich mēgt mich shem'ma
2. du mēgsht dich shem'ma
3. är mēgt sich shem'ma

Plural.

1. mir mēch'ta uns shem'ma
2. ir mēch'ta aich shem'ma
3. si mēch'ta sich shem'ma

PERFECT TENSE.

- | | |
|--------------------------------|--------------------------------|
| 1. ich mäg mich gshemt ha'wa | 1. mir mē'gha uns gshemt ha'wa |
| 2. du mägsht dich gshemt ha'wa | 2. ir mē'gha aich gshemt ha'wa |
| 3. är mäg sich gshemt ha'wa | 3. si mē'gha sich gshemt ha'wa |

PLUPERFECT TENSE.

- | | |
|--------------------------------|---------------------------------|
| 1. ich mēgt mich gshemt ha'wa | 1. mir mēch'ta uns gshemt ha'wa |
| 2. du mēgsht dich gshemt ha'wa | 2. ir mēch'ta aich gshemt ha'wa |
| 3. är mēgt sich gshemt ha'wa | 3. si mēch'ta sich gshemt ha'wa |

FIRST FUTURE TENSE.

- | | |
|------------------------------|-------------------------------|
| 1. wan ich mich shem'ma sol | 1. wan mir uns shem'ma sol'la |
| 2. wan du dich shem'ma solst | 2. wan ir aich shem'ma sol'la |
| 3. wan är sich shem'ma sol | 3. wan si sich shem'ma sol'la |

SECOND FUTURE TENSE.

- | | |
|---------------------------------------|------------------------------------|
| 1. Wan ich mich gshemt ha'wa sol | 1. Wan mir uns gshemt ha'wa sol'la |
| 2. Wan du dich gshemt ha'wa
sodsht | 2. Wan ir aich gshemt ha'wa sol'la |
| 3. Wan är sich gshemt ha'wa sol | 3. Wan si sich gshemt ha'wa sol'la |

CONDITIONAL MOOD.

FIRST FUTURE.

- | | |
|---------------------------|--|
| 1. ich sedt mich shem'ma | 1. mir sed'ta (or sod'ten) uns shem'ma |
| 2. du sodsht dich shem'ma | 2. ir sod'ta aich shem'ma |
| 3. är sodt sich shem'ma | 3. si sod'ta sich shem'ma |

SECOND FUTURE.

- | | |
|--------------------------------|--------------------------------|
| 1. ich sedt mich gshemt ha'wa | 1. mir sed'ta uns gshemt ha'wa |
| 2. du sodsht dich gshemt ha'wa | 2. ir sod'ta aich gshemt ha'wa |
| 3. är sodt sich gshemt ha'wa | 3. si sod'ta sich gshemt ha'wa |

IMPERATIVE MOOD.

- | | |
|--------------------|--------------------|
| 1. <i>wanting.</i> | 1. <i>wanting.</i> |
| 2. shem dich | 2. shemt aich |

INFINITIVE MOOD.

PRESENT TENSE.

tea shem'ma

PAST TENSE.

sich gshemt ha'wa

COMPOUND VERBS.

Compound verbs are formed by prefixing adverbs or prepositions to simple words, usually verbs and rarely adverbs and adjectives, thus varying or modifying their signification. When these prefixes permit the insertion of tse or tsä between themselves and the radical, or their transfer, so as to become suffixes, as in the present indicative, they are termed *separable*; as uf'shteⁿ, *to rise* or *to stand up*, from uf, *up* + shteⁿ, *stand*.

Compound prefixes are also used and are *separable*, as dafun'lâ'fa, *to go away from, to leave*, from da, *there* + fun, *from*, + lâ'fa, *to go* or *walk*.

Prefixes are *inseparable* when they are so closely united with the radical as not to permit the preposition tse or tsä between the prefix and the radical. When compound prefixes occur, the first prefix may become *separable* from the second and *inseparable* prefix to allow the intervention of tse or tsä in the present infinitive, as uf + shtëⁿ, *up + rise* (from bed), = uf'tsäshtëⁿ, *to rise*—literally, *up to rise*.

IMPERSONAL VERBS.

Impersonal verbs are used only in the third person singular, and have for their subject the pronoun es, *it*—sometimes abbreviated to 's, which in ordinary conversation is frequently pronounced as if forming the first letter of the verb, thus forming no apparent and distinct syllable. The following are examples:

es shnēt = 's shnēt, *it snows*.

es re'ghert = 's re'ghert, *it rains*.

es kis'lt = 's kis'lt, *it is sleeting*.

ARTICLES.

The definite article der or dār—contracted into d'r—and the indefinite article en—contracted into 'n—are both used, and inflected as follows:

	Singular.			Plural.
	Masc.	Fem.	Neut.	For all genders.
Nom.	der, or d'r	di	's	Nom. di
Gen.	'm sai ⁿ	d'r irs	'm sai ⁿ	Gen. d'i'ra
Dat.	'm	d'r	'm	Dat. de
Acc.	der, or d'r	di	's	Acc. di

	Singular.			Plural.
	Masc.	Fem.	Neut.	For all genders.
Nom.	en, or 'n	en, or 'n	en, or n	Nom. } Gen. } Dat. } Acc }
Gen.	—	—	—	} <i>wanting</i> .
Dat.	'm-a	'r-a	'm-a	
Acc.	'n	'n	'n	

PRONOUNS.

PERSONAL PRONOUNS.

The five personal pronouns are *ich, I; du, thou; är, he; si, she; es, it;* and are inflected as follows:

First Person.

	<i>Singular.</i>	<i>Plural.</i>
Nom.	<i>ich, I</i>	<i>mir, or m'r, we</i>
Gen.	<i>maiⁿ, mine, or of me</i>	<i>uns'r, our, or of us</i>
Dat.	<i>mir, to me</i>	<i>uns, to us</i>
Acc.	<i>mich, me</i>	<i>uns, us</i>

Second Person.

Nom.	<i>du, or de, you</i>	<i>ir, or 'r, you</i>
Gen.	<i>daiⁿ, your</i>	<i>air, your</i>
Dat.	<i>dir, d'r, to you</i>	<i>aich, or ich, to you</i>
Acc.	<i>dich, you</i>	<i>aich, you</i>

Third Person, Masculine.

Nom.	<i>är, or 'r, he</i>	<i>si, they</i>
Gen.	<i>saiⁿ, his, or of him</i>	<i>i'ra, their, or of them</i>
Dat.	<i>im, to him</i>	<i>i'na, or 'na, to them</i>
Acc.	<i>in, him</i>	<i>si, them</i>

Third Person, Feminine.

Nom.	<i>si, she</i>	<i>si, they</i>
Gen.	<i>i'ra, or irs, hers, or of her</i>	<i>i'ra, their, or of them</i>
Dat.	<i>i'ra, or ärä', to her</i>	<i>i'na, or 'na, to them</i>
Acc.	<i>si, her</i>	<i>si, them</i>

Third Person, Neuter.

Nom.	<i>es, or 's, it</i>	<i>si, they</i>
Gen.	<i>saiⁿ, or sains, its, or of it</i>	<i>i'ra, their, or of them</i>
Dat.	<i>em, or 'm, to it</i>	<i>i'na, or na, to them</i>
Acc.	<i>es, or 's, it</i>	<i>si, them</i>

Although *du* is used in addressing the Supreme Being, the second person plural, *ir*, is generally resorted to in addressing the aged, or a superior.

DEMONSTRATIVE PRONOUNS.

The demonstrative pronouns *där* or *der, this*, and *sel'er* or *sel'r, that*, are inflected as follows:

	<i>Singular.</i>			<i>Plural,</i>
	<i>Masc.</i>	<i>Fem.</i>	<i>Neut.</i>	<i>For all genders.</i>
Nom.	<i>där, or der</i>	<i>di</i>	<i>des</i>	<i>di</i>
Gen.	<i>dem saiⁿ</i>	<i>dä'ra ir</i>	<i>dem saiⁿ</i>	<i>de'na ir, or i'ra</i>
Dat.	<i>dem</i>	<i>da'ra</i>	<i>dem</i>	<i>den'a</i>
Acc.	<i>den</i>	<i>di</i>	<i>des</i>	<i>di</i>

Singular.			Plural.	
	<i>Masc.</i>	<i>Fem.</i>	<i>Neut.</i>	<i>For all genders.</i>
Nom.	sel''r	sel'i	sel	sel'-li
Gen.	sel''m sai ⁿ	sel''r 'ra	sel'm sai ⁿ	sel'-la i'ra
Dat.	sel''m	sel''r 'ra	sel'm	sel'-la
Acc.	sel''r	sel'i	sel	sel'-li

POSSESSIVE PRONOUNS.

As will be observed by reference to the preceding inflexions, the possessive pronouns are derived from the genitive case of the personal pronouns. They are maiⁿ, daiⁿ, saiⁿ, i'ra or irs, saiⁿ or sains, from the singular, and uns'r, air and i'ra from the plural.

INDEFINITE PRONOUNS.

Indefinite pronouns, representing persons or things without particular specification, are used, the most important of which are here given, viz.:

man, *one, some one.*

eb'ber, *some one, somebody.*

nim'mand, *no one, nobody.*

ken'ner, *no one, neither.*

ēⁿ'ner, *one, some one.*

ye'derer, *each one.*

man'icher, *many a one.*

et'-lich a, *some, several.*

eⁿ'nicha, *some, any one.*

REFLEXIVE AND RECIPROCAL PRONOUNS.

A pronoun is termed *reflexive* when the action represented thereby reverts upon the agent, as *är shnait sich, he cuts himself*; *sich* being equivalent to either *himself, herself, itself* or *themselves*.

In German, a reflexive pronoun becomes *reciprocal* when the intention is to represent the actors in the plural as acting mutually, and to avoid ambiguity the reciprocal word *einander*, one another, is added or substituted for *sich*, themselves; this, however, is not the case in the present, as *sich* is dropped, the reciprocal *einander* (nan'nēr) being sufficient, as, *si shnai'tā nan'-ner, they cut one another*.

INTERROGATIVE PRONOUNS.

The interrogative pronouns are *wär, who*; *was, what*; *wel'ler, which one*; and, *was far en, what sort of a, or what kind of a*. These are inflected like the relative pronouns, excepting *was far en*, in which *en* only is inflected, excepting in the plural, where it is omitted in all genders.

ADJECTIVES.

Predicative adjectives seldom undergo change, but attributive adjectives are declined like the definite article.

Adjectives, having in the positive a terminal ai, au, from the comparative by adding er or 'r, as :

<i>Positive.</i>	<i>Comparative.</i>
shai, <i>shy</i>	shai'-er, <i>shyer</i>
trai, <i>true</i>	trai'-er, <i>truer</i>
rau, <i>coarse</i>	rau'-er, <i>coarser</i>

Adjectives, having in the positive the ending ai, ch, d, s, t, and u, take for the superlative sht.

Irregular comparisons occur, the most important being the following :

<i>Positive.</i>	<i>Comparative.</i>	<i>Superlative.</i>
gūt, <i>good</i>	bes'ser	besht
lâng, <i>long</i>	leñg'er	leñgsht
negsht, <i>near</i>	ne'gher	negsht
fil, <i>much or many</i>	mē ⁿ	mensht

It has already been stated that adjectives are declined like the definite article, in the nominative and accusative. The following are the terminations in the several cases and genders in both singular and plural ; where a dash occurs, there is no alteration or suffix to the adjective :

	Singular.			Plural. For all genders.
	Masc.	Fem.	Neut.	
Nom.	—er or 'r	—i	—es or 's	Nom. —a
Gen.	—a sai ⁿ	—a	—a	Gen. —a
Dat.	—a	—a	—a	Dat. —a
Acc.	—'r	—i	—'s	Acc. —i or a

NUMERALS.

In German, the numerals are classified according to the signification, and the general usage obtains in Pennsylvania. These classes are termed Cardinal, Ordinal, Distributive, Multiplicative, Variative, Adverbial, Distinctive, Partitive, and Indefinite. Dimidiative numerals are not in use to express the same idea as in the German.

A short list of the Cardinals and Ordinals is here presented :

<i>Cardinals.</i>	<i>Ordinals.</i>
1. ēns, ēn, ē'ner	ārsht
2. tswē	tswet
3. drai	drit
4. fir, or fl'ra	firt
5. finf, fin'fa	finft
6. seks, or sek'sa	sekst

<i>Cardinals.</i>	<i>Ordinals.</i>
7. si'wa	si'-wet
8. ach'ta	acht
9. nain, nai'na	naint
10. tse'a	tse'-et
11. elf, el'fa	elft
12. tswelf, tswel'fa	tswelft
13. drai'tse	drai'tset
14. fār'tse	fār'-tset
15. fuf'tse	fuf-tset
16. sech'tse	sech'-tset
17. si'-wa-tse	si'-wa-tset
18. ach'tse	ach'-tset
19. nain'tse	nain'-tset
20. tswan'sich	tswan'-sisht
21. en'-un-tswan' sich	en'-un-tswan'-sisht
30. drai'-sich	drai'-sisht
40. fārt' sich	fārt'-sisht
50. fufft-sich	fuf'-sisht
60. secht'-sich	secht'-sisht
70. si'-wet-sich	si'-wet-sisht
80. acht'-sich	acht-sisht
90. naint'-sich	nain'-sisht
100. hun'ert	hun'-ertsht
101. hun'ert un ēns	hun'ert un ärsht
102. hun'ert un tswe	hun'ert un tswet
200. tswe hun'ert	tswe hun'ertsht
1000. dausent.	dau sentsht

In the preceding, the Ordinal numbers from twenty to ninety are recorded as they are most frequently pronounced; though upon closer examination the sounds given are usually a little more difficult for one to acquire. They consist of the syllable *sht* being added to the cardinal number, making, for example, *tswan'-sich + sht*, *drai'-sich + sht*, and should be written *tswan'-sichsht*, *drai'-sichsht*, to represent the complete form, instead of the final syllable *sisht*.

Distributive numerals are formed by coupling cardinals by the conjunction *und* (= *un* or 'n), as *tswe un tswe*, *two and two*, etc.

Multiplicative numerals are those having *fach*, *fold*, as a suffix to the cardinals, as *ēⁿfach*, *onefold*, *single*; *drai'fach*, *threefold*.

Variative numerals have the suffix *lai* or *le* (sort or kind) added to the cardinals, and for the sake of euphony, or preceding that suffix, as, *e'ner-le'*, of *one kind*; *drai'er-le'*, of *three kinds*.

Adverbial numerals are formed by adding the suffix *mol* or *mols* to cardinals and indefinite numerals, as *ēⁿ-mol*, *one time*, or *once*; *si'-wa-mol*, *times*; *ye'der-mol*, *each time*; *fil'-mols*, *many times*, or *often*.

Distinctive numerals are formed by adding *ens*, as a suffix, to the ordinal numbers, as *ärsht'ens*, *firstly*, or *in the first place*; *tswet'ens*, *secondly*, etc.

Another class, which properly comes under this group, is the union of the cardinal number with the suffix *er*, to designate one as belonging to, valued at, etc.; as *finf'er*, a *five*, *i. e.*, a five dollar gold piece; one belonging to a company having for its designation No. 5.

Partative numerals are formed by adding 'l, *el*, or *t'l*, *part*, to the ordinals, as *drit't'l*, a *third*, *sekst't'l*, *sixth*, etc.

Indefinite numerals are those which are, in English, usually recognized as adjectives, and serve to indicate number, as *yö'der*, *each*, *yö'des*, *each*; to indicate quantity, as *eb'bas*, *some*, *gans*, *the whole*—as opposed to a part—*halb*, *half*, etc.; and those to indicate both number and quantity, as *all*, *all*; *ken'ni*, *none*; *fil*, *much*; *wen'ich*, *a little*; *genunk'*, *enough*.

AUXILIARIES OF MODE.

These are *där'fa*, *ken'na*, *mö'gha*, *mis'sa*, *wol'la* and *los'sa*, with all of which the verb is used without the particle *tse* or *tsa*, except *ken'na* when signifying to *know*.

THE DEMONSTRATIVE PRONOUN, *this*.

	Singular.			Plural.
	Masc.	Fem.	Neut.	For all genders.
Nom.	där	dī	des	de
Gen.	dem sai ^a	da'ra ir	dem sai ^a	den'na Y'ra
Dat	dem	dara	dem	den'na
Acc.	den	dī	des	dī

DEMONSTRATIVE, *that*.

	Singular.			Plural.
	Masc.	Fem.	Neut.	For all genders.
Nom.	sel'r	sel'li	sel	selli
Gen.	sel'm sai ^a	sel'r i'ra	sel'm sai ^a	sella ira
Dat.	sel'm	sel'ra	sel'm	sella
Acc.	sel'r	sel'li	sel	selli

INDETERMINATE, *one*.

	Singular.
Nom.	m'r.
Gen.	—
Dat.	sich
Acc.	'm

INTERROGATIVES, *who* AND *which*.

		Singular.			Plural.
		Masc.	Fem.	Neut.	For all genders.
Nom.	wär	welli	wel	war, welli	
Gen.	wem sai ⁿ	wellera ir	wem sai ⁿ	wella ir	
Dat.	wem	wellera	wel'm	wella	
Acc.	wen	welli	wel	welli	

The interrogative *what* is was throughout.

VOCABULARY.

- â*, 1. also, too; *ich â*—I also, or, I too.
 2. alas! what a pity! too bad! etc.
- âⁿ*, 1. on, as clothing on the body; *är hot saiⁿ henshing âⁿ gedu'*—*he put on his glove*.
 2. to begin, or to take in; as, *wân fängt di musik âⁿ ?—lit., when does the music begin*.
- ab*, off, from; as a prefix to many verbs, when it conveys the sense of removal, detraction.
- ab'-a-dëk*, drug store.
ab'-a-de'-ker, apothecary, druggist.
ab'-a-dil-dak, opodeldoc.
ab'-a-dit, appetite.
ab'-a-dit-lich, appetizing, pleasant to the taste.
- âⁿ-bai-sä*, to bite into (for the first time).
âⁿ-bard-lich, particular, particularly.
ab'-bärsh-ta, to brush off; to finish up.
a-bart'-ich, particular, particularly.
âⁿ-bart-lich. See *âⁿ-bärd-Ich*.
âⁿ-bas-sa, 1. to fit, on a person or thing; to try on.
 2. to successfully deceive or cheat; to impose upon another; as to betray a girl by seduction.
- ab'-bi-da*, 1. to outbid at a public sale.
 2. to warn, or bid one to remain away from a place.
ab'-bin-na, to tire a wheel with iron; to hoop, as a cask.
ab'-bla-da, to pluck off leaves.
ab'-blë-cha, 1. to fade.
 2. to bleach, to whiten by exposure to sun or rain.
ab'-blî-a, to cease blooming.
ab'-blo-sa, to blow off.
âb'-bir, strawberry.
ab'-brech-a, to break off.
ab' bri-a, to scald, or to complete by scalding.
ab' bruch, cessation.
ab'-bud-sa, to wipe off, to clean.
ab'-dank-ka, to resign, to decline.
ab'-dek-ka, to uncover, to unroof.
ab'-dë-la, to divide, to share around in parts.
âⁿ be-fë-la, to enjoin, or request.
âⁿ-be-lang-a, to relate to, or to concern.
â'-bend-mâl, The Lord's Supper.
âⁿ-bë-ta, 1. to worship.
 2. to supplicate, or solicit.
âⁿ-bë-tiñg, an offer, or paper in supplication of a desire.
âⁿ-bë-tuñgs-wer-tich, adorable; that which may be worthy of adoration.
ab'-fal, refuse, offal
ab'-fal-la, to fall off.

ab' fōd-ra, to ask from.

ab' ga-wē-na, to discontinue a habit or custom; to wean.

ab' hand'la, to get rid of by sale or exchange, to dispose of.

ab' har-ich a, to hear or to listen to.

ab' hē-la, to heal off; to heal by desquamation, or by the scab falling.

ab' henk-ish, sloping; inclined.

ab' hē-ra, 1. to hear a statement, or to grant a hearing.

2. to molt, or shed hair.

âⁿ-bin-na, to hitch, or tie fast; to secure.

âⁿ-bī-da, to offer, to accost.

âⁿ-bid-ta, to pray to, to persuade.

ab' kep-pa, to chop off the head, as of fowl.

ab' klō-ra, 1. to clarify—liquors.

2. to clear off—weather.

ab' lâ-da, to unload.

ab' lâ-fa, to drain off; to walk off.

ab' lē-gh'l-ä, to deny; to transfer blame upon another.

ab' lē-sa, to read off.

âⁿ-blik, a glimpse; a view.

âⁿ-bli-ka, to view, or to take a hurried glimpse.

âⁿ-blins-la, to blink at, or to wink at.

ab' los, an outlet; a ditch for draining.

âⁿ-blan-tsa, to begin planting; to start by planting.

âⁿ-blō-sa (*infn.*, *âⁿ-zū-blō sa*), to start by blowing at; to kindle by blowing.

ab' los-sa, to let off, to allow escape to a person or thing.

ab' mâ-gher-a, to emaciate.

ab' mō-la, to draw, or make a sketch of anything.

ab' nem-ma, 1. to take off.

2. to depreciate in size or quantity.

3. to amputate, or cut off.

âⁿ-bō-ra, to bore, or to tap; refers to beginning of action only—the start.

ab' rai-sa, 1. to tear off, to sever.

2. to take departure for a journey.

ab' rāⁿ-ma, 1. to skim cream from milk.

2. to remove dishes and arrange in order.

ab' rech-lu, 1. to deduct from an account

2. to square accounts.

ab' rech-lūng, an account.

ab' rech-lūng, an account.

âⁿ-bren-na, to kindle; to scorch.

âⁿ-brī-a, to scald, or to steep for an infusion.

ab' ri-gōs', apricot.

âb' ris, a plan, design.

ab' ritsh a, to slide off.

ab' rō-da, to dissuade; to warn.

âⁿ-bruch, daybreak; the early approach of day.

âⁿ-brum ma, to growl at; to roar at in a low deep tone, as a bull.

ab' sads, heel of a shoe.

ab' sū-gha, to deny, to refuse.

ab' saiⁿ-na, to sign off—as legal instruments; to relinquish by signing.

ab' sa lut', absolute.

ab-sa-nät', particular, precise, obstinate.

ab' set-sa, to set off or aside, to dismiss.

ab' shaf-fa, 1. to work off, to eliminate.

2. to discontinue.

ab' shai, abhorrence, hatred.

ab-shai'lich, abominable.

ab' shâ-ma, to scum, or remove scum.

ab' shaum'-ma, to remove froth, or scum.

ab'-shē-la, 1. to peel, to desquamate.

2. to pare.

ab'-shin-na, 1. to skin off—as bark.

2. to flay.

3. to abrade.

ab'-shī-wa, to postpone, to defer.

ab'-shrai-wa, to copy.

ab'-shrau-wa, to loosen by removing screws, to unscrew.

ab'-shrek-ka, 1. to scare off.

2. to intimidate.

ab'-shrit ta, to step off, or to measure by steps.

ab'-shteⁿ-a, to begin to spoil.

ab'-shtë-la, to steal or sneak away.

ab'-shtai-gha, to dismount; to step down.

ab'-shtek-ka, to stake off.

ab' shtim ma, to put to vote.

ab'shtrai cha, to smooth down the fur or hair of an animal.

ab'-shtri-gh'l-a, to curry down.

ab'-shtrō-fa, to reprimand.

ab'-shwâr-ta, 1. to give a beating.

2. to split into slabs.

ab'-shwenk-ka, to rinse, or wash off.

ab'-shwē-ra, to swear off, to reform.

ab'-sau-fa, to drain by sucking.

ab'-sicht, purpose, design.

ab'-tē-pa-ra, 1. to taper down.

2. to cease drinking liquors, after a debauch.

ab'-tren-na, to unseam; to rip off.

ab'-tsâr-ka, to make exact; to describe outlines with mathematical instruments.

ab'-tsē-ra, to become emaciated.

ab'-tsug, 1. departure, leave.

2. deduction.

ab'-wai-cha, to leave the proper course; to warn.

ab' wâr ta, to serve, to wait upon, to nurse.

ab'-wâr-tern, a female waiter or nurse.

ab' wai cha, to deviate, to deflect.

ab'-wē-da, to remove pasture by grazing.

ab'-wēk, off road, wrong way.

ab'-weks-la, 1. to make mutual exchange.

2. to alternate.

ab'-welk'-ka, to wither, to fall off through withering.

ab'-wē-ra, 1. to wear off.

2. to dissuade.

ab'-wī-gha, to weigh off, in parcels or quantities.

ab'-wish-er, a duster or wiper; a mat.

ab'-yâ-gha, to drive away; to scare off.

ach, an interjection equivalent to oh! well, but; used frequently to denote that a thing or action has been forgotten or neglected.

acht, eight.

acht'ta, eight.

acht'sam, careful.

acht'-tse, eighteen.

acht'-sich, eighty.

âⁿ-dacht, attention.

âⁿ-dai-ta, to indicate, or to hint.

âⁿ-dech-tich, attentive.

âⁿ-denk-ka, keepsake, memento.

âⁿ-denk-üs, a memento; a memorial; keepsake.

âd'ler, an eagle.

âⁿ-drai wa, to start to drive, to urge forward.

âⁿ-dre a, to turn on, as a spigot.

âⁿ-dref-fa, to meet; to come in contact.

âⁿ-duⁿ, to dress, to clothe.

af, monkey, ape.

âⁿ-faich ta, to become moist.

âⁿ-fai-la, to file; the first indications of having been filed.

âⁿ-fai-ra, to set fire to; or to light, as a stove or furnace.

âⁿ-fal la, to assail, to fall upon.

âⁿ·fâñg, beginning; origin.

âⁿ·fâñg-a, to begin, to commence.

âⁿ·fâñgs, at first, from the beginning of a certain time.

âⁿ·fâ ra, to drive, or lead in driving.

âⁿ·fur-drau'-a, to entrust; to confide.

âⁿ·fârsh-da, plowing furrows to indicate direction.

âⁿ·fau-la, to show a beginning of decay.

âⁿ·fech-ta, to fight; the beginning of a quarrel.

âⁿ·fech-diñg, a contention or quarrel; usually applied to legal strife between individuals.

âⁿ·fêñg-er, a beginner, a novice.

âⁿ·fîñg-ra, to handle with in a meddling way.

âⁿ·fit-ta, to try on, or to fit; frequently used instead of *âⁿ·bâs-sä*.

âⁿ·fî-la, to touch, to feel.

âⁿ·fî-las, sympathy; feeling for.

âⁿ·fî-ra, 1. to disappoint, to mislead.

2. to betray—as a girl by seduction.

âⁿ·flick-ka, to patch on another body.

âⁿ·fres-sa, to gnaw at; to show signs of having been eaten of.

âg, an eye; *pl.*, *â'·ghä*.

âⁿ·ga bis'-sä, anything which has been bitten into, is said to be *âⁿ·ga-bis-sä*; a bite taken from an apple, or other edible object.

â'·gha-blets'-lich, immediately.

âⁿ·ga-bod-ta, offered.

âⁿ·ga-bö-ra, hereditary; congenital.

âⁿ·ga-bördt, started to be bored or drilled; the boring or drilling in its beginning, or commencement.

âⁿ·ga-budt, the first bid, or offer, at a sale.

âⁿ·ga-lê-ghäs, a yearning; concern.

âⁿ·ga-nêm, pleasant, agreeable.

âⁿ·ga-nêm-lich, agreeable, agreeably.

âⁿ·ga-nêm lich-er-wais, in an agreeable, or pleasant manner.

âⁿ·ga'-num'-ma, accepted; feigned.

âⁿ·ga-roshtë, to show signs of rusting.

âⁿ·ga-sicht, countenance.

âⁿ·ga-wâk'-sa, grown fast to. This term is applied to pleurisy, the idea being that "the liver has grown to the surrounding vicera and to the ribs."

âⁿ·ga wê'-na, to contract a habit; to acquire, or to accustom.

âⁿ·ga-wê-net, a habit; or acquired custom.

âⁿ·ge-wa, to lodge information; to inform, or to suggest.

âⁿ·gfauldt, speckled by decaying.

âⁿ·gfîrdt, 1. disappointed, fooled.

2. betrayed, seduced.

â·gha-âb'l, eyeball.

â' gha-ap'-el, eyeball.

â'·gha-blik, a moment; an instant; a hurried glimpse.

â gha-blik-lich, immediately.

â'·gha-brö, eyebrow; *pl.*, *â'·gha-brö-a*.

â' gha-deck'l, eyelid; *sing.* and *pl.*

â'·gha-dok-ter, an oculist.

â'·gha-hör, an eyelash.

â·gha-haid'-tl, an opacity of the eye; a membranous growth known as terigium. Sometimes used for cataract, *shtâr*.

â'·gha-lush't, the eyes' delight; the "delight of the eyes."

âⁿ·glâ-gha, to accuse; to complain of to others, or to legal authorities.

- âⁿ'-glē-wa*, to cleave to ; to paste on
or to stick to.
- âⁿ'-grai-fa*, 1. to grasp, or attack.
2. to comprehend.
- âⁿ'-grif*, an attack ; act of grasping.
- âⁿ'-gsicht*, countenance, face ; view
or prospect.
- âⁿ'-gsicht-a*, prospects.
- âⁿ'-guk-ka*, to look at, to behold.
- âⁿ'-hal-ta*, to continue, to perse-
vere.
- âⁿ'-har-ich-ä*, to listen to, to pay
attention to.
- âⁿ'-heñg-er*, adhere, a hanger-on.
- âⁿ'-hē-ra*, to listen to, to obey.
- ai*, an exclamation of surprise ; is
frequently repeated several
times when seeing or hearing
anything of a surprising or
astonishing character.
- âi*, egg.
- aiⁿ'-lī-sa*, to incur danger, to lose,
to meet with misfortune.
- aiⁿ'-bil-da*, to imagine, to fancy.
- aiⁿ'-bild-iñg*, imagination.
- aiⁿ'-bin-na*, to wrap up, or in ; to
bind.
- aiⁿ'-blō-sa*, to start a furnace ;—re-
lates to iron works.
- aiⁿ'-brech'-a*, 1. to break into, to
burglarize.
2. to break to harness.
- ai'-dēks*, lizard, newt, salamander.
- ai'-der*, 1. the yolk of an egg.
2. udder, of cow.
- aiⁿ'-drâ-gha*, to bring in, or to
yield.
- âi'-er-dot'-ter*, yolk of egg.
- aiⁿ'-fal-la*, to cave in.
- aiⁿ'-fardt*, entrance, gate-way.
- aiⁿ'-fed'l-ä*, to thread.
- ai'-fer*, eagerness, zeal.
- ai'-fer-a*, to endeavor, to be zeal-
ous.
- ai'-fer-ich*, zealous, energetic.
- aiⁿ'-gañg*, entrance.
- aiⁿ'-ga-richt*, arranged, prepared,
furnished.
- aiⁿ'-geⁿ-a*, to shrink.
- aiⁿ'-ge-wa*, 1. to give in, to consent.
2. to administer—medicine.
- ai'-gha-dum*, property, possessions.
- aiⁿ'-grai-fa*, to make inroad up ; to
comprehend.
- aiⁿ'-grâ-wa*, to bury, or inter.
- aiⁿ'-hak-ka*, to cut into, to chop
into.
- aiⁿ'-hal-da*, to hold in ; to slacken ;
to keep in—as at school.
- aiⁿ'-hō-la*, to overtake.
- aiⁿ'-kâ-fa*, to buy in, to purchase.
- aiⁿ'-kē-ra*, 1. to put up at a public
house.
2. to begin house-keeping.
- aiⁿ'-koch-ä*, to boil down ; to con-
centrate by boiling.
- ail*, 1. an owl ; *pl.*, *ai'-la*.
2. a hurry, haste.
- ai'-la*, to hasten, hurry.
- aiⁿ'-lâ-da*, to invite.
- aiⁿ'-lâ-diñg*, invitation.
- aiⁿ'-mach-a*, to preserve.
- aiⁿ'-nem-ma*, 1. to take internally ;
to receive money in trade—
as in a store.
2. to cheat or deceive.
- aiⁿ'-rai-sa*, to encroach upon.
- aiⁿ'-rich-ta*, to fit up, to arrange in
shape, or to furnish.
- ais*, ice.
- ai'-sa*, iron.
- aiⁿ'-sal-sa*, to put in salt or brine ;
to salt down for the future.
- ai'-sieh*, icy, slippery on account of
ice, or sleet.
- aiⁿ'-sal-tsa*, to pack in salt ; to salt
down.
- ai'-sa-maindt*, iron ore ; iron mine.
- ai'-sa-shtör*, hardware store.
- aiⁿ'-sē-a*, to sow for coming crops.
- aiⁿ'-sē-ghna*, to confirm—a religious
rite.

aiⁿ'-set-sa, to put in,—as limestone into a kiln; to install into a position or office.

aiⁿ'-shän'-'fa, to enjoin, to cram.

aiⁿ'-shenk-a, to pour out, or into other vessels, as into tea-cups, etc.

aiⁿ'-shla-gha, lightning to strike an object; to strike into suddenly and violently.

aiⁿ'-shlak, woof.

eiⁿ'-shlō-fa, to fall asleep.

xiⁿ'-shlum-'r-ä, to fall into a slumber.

aiⁿ'-shlup-pa, to crawl in or into.

aiⁿ'-shnē-a, to snow in, or to become covered by drifting snow.

aiⁿ'-shpan-na, to hitch up—in harness.

aiⁿ'-shrai-wa, to inscribe; to write into a book; a preliminary writing to a document.

aish'-ter, oyster.

ais'-tsap-pa, icicle.

aiⁿ'-tswiñg-a, to force one to swallow, or take internally.

aiⁿ'-wai-ä, to dedicate.

aiⁿ'-wai-iñg, dedication.

aiⁿ'-wâⁿ-ner, inhabitant.

aiⁿ'-wēch-ä, to put in soak, to moisten.

aiⁿ'-wen-iñg, an invention, an excuse.

aiⁿ'-wik-'l-a, 1. to wrap up, to bandage.

2. to deceive and impose upon—equivalent to the common expressions "to take in," or "to rope in."

āk, an eye; *pl.*, *ä'-ghä*.

ak'-a-äi-ra, to make an agreement.

ak'-er, acre.

âⁿ-ket-ta, to secure with a chain.

âⁿ'-kfauld^t, speckled or spotted by rotting.

âⁿ'-kin-dich-a, to inform, or to announce.

âⁿ'-klâ-gha, to accuse; to complain about to the authorities.

âⁿ'-klē-äa, 1. to clothe, or to dress.

2. to ingratiate.

âⁿ'-knep-ba, to button on, to secure by buttoning.

âⁿ'-knip-ba, to tie on, securing by knots.

aks, 1. axe.

2. axle.

âⁿ'-kset-'ll, first settled; first indications of settlement.

aks'-'l, 1. shoulder.

2. axle.

ak-to-'w'r, October.

âⁿ'-kum-ma, to succeed, to get on.

âⁿ'-kum-mer, a new-comer; one who has arrived or is about to arrive.

al, all.

aⁿ'-lai-a, solicitude.

âⁿ'-lañg-es, longing, yearning.

al'-auⁿ, alum.

al-dâr', altar.

al'-der, 1. age.

2. old one—a rude term applied to a man advanced in years.

a-lēⁿ', alone.

âⁿ'-le-ghä, 1. concern, to yearn for.

2. to lay on, as laying on a coat of paint.

âⁿ'-lē-ghäs, a yearning for; concern.

a-lēⁿ'-nich, alone.

al'fart, always, ever.

al'-le, all.

al-leⁿ', alone.

al'le-dâk, every day, daily.

al'le-ga-bot', every once in awhile; frequently.

al'-ge-maiⁿ, average, commonly.

al'-ge-mēⁿ, average, commonly.

al'-le-mōl', every time.

al'-ler-ärsh^t', very first; the first of all.

- al'-ler-diñgs*, sure enough, to be sure.
- al'ler-hand*, all sorts, *mélange*.
- al'-ler-lai*, various sorts, various kinds.
- al'-ler-lé'*, all sorts, various kinds.
- al'-les*, everything.
- al'-le-wail'*, just now, at present.
- al-mech'-tich*, Almighty.
- al'-mi-nan'-ner*, all together.
- al'-mō-sa*, alms.
- al'-niks*, in vain, fruitless; *lit.*, all nothing.
- â^{n'}-los-sa*, to let on; to pretend.
- al'-o-wē*, aloes.
- als*, as, still, while.
- als'-a-mōl*, sometimes.
- alt*, old, aged.
- alt'-er*, 1. age.
2. old one, *i. e.*, "the old man;" generally used by a wife when speaking of her husband.
- am*, at, at the, on the, by; contraction of *an des*.
- â^{n'}-mach-a*, 1. to mix, or to prepare.
2. to make up to, to gain one's esteem.
- am'-a-pa'-dish*, homeopathic.
- âm'-bâ-rel'*, umbrella.
- â^{n'}-me-ã*, to begin mowing, or reaping.
- â^{n'}-met*, the second crop of hay.
- âm'-shel*, robin—*merula migratoria*.
- âmt*, office, position.
- an*, on, at, by.
- â^{n'}-na*, without, but.
- â^{n'}-na'-gh'la*, to nail fast to; to attach to by nailing.
- â^{n'}-ârsht*, other, otherwise.
- â^{n'}-nē-a*, to sew fast to, or to attach by sewing.
- â^{n'}-nem-mã*, 1. to accept, or to adopt.
2. to feign or to "take on."
- an'-er*, other.
- an'ersht*, otherwise, differently.
- âñg'-ker*, anchor.
- ans*, at the, to the; contraction of *an des*.
- ânt'-wart*, answer, reply, response.
- ânt'-war-tã*, to answer, to respond.
- â^{n'}-pak-ka*, to attack; to endeavor to overcome.
- âp'bîr*, strawberry.
- âr*, he, him.
- âr'-ã-bîr*, strawberry.
- âr'âbs*, pea.
- â^{n'}-rai-a*, to baste.
- â^{n'}-rai-sa*, to tear off a portion; to begin to tear into.
- â^{n'}-rai-wa*, 1. to rub on or against.
2. to ingratiate, by keeping in contact with another.
- â^{n'}-rank-kã*, plants securing a hold by means of tendrils.
- âr'-ã-wel*, labor or occupation.
- ârbs*, pea.
- âr'b-sã*, to inherit; to receive by heredity, or congenitally.
- âr'b'-shaft*, legacy.
- ârd*, earth; world.
- âr'-dã*, earthen.
- ârd'-ab-p'l*, artichoke.
- ârd'-bē-buñg*, earthquake.
- ârd'-flē*, plant louse, plant insect; *lit.*, earth flea.
- ârd'-gaisht*, gnome, "puck," bogy.
- ârd'-licht*, *ignis fatuus*, will o' the wisp.
- ârd'-niñg*, order, quiet.
- ârd'-shol-lã*, a clod of earth.
- ârd'-shwam*, mushroom, fungus, agaric; *lit.*, earth sponge.
- ârdt*, 1. sort, kind, variety.
2. place, locality.
- ar'-ântsh*, orange.
- â^{n'}-red-tã*, to address, to speak to.
- â^{n'}-rē-gha*, to touch.
- â'-rem-sē'-lich*, miserable, wretched.
- âr'-entsh-tswi'-w'l*, Indian turnip.
- âr-fâ'-ruñg*, experience.
- âr-fln'-nuñg*, invention, discovery.

är-frai'-a, 1. to gladden.

2. to free one's self, or to liberate.

är-frish'-ä, to refresh.

är-frish'-uñg, refreshment, recreation.

är-hal'-tä, to maintain, to retain, to support.

är-hē'-ä, to exalt, to elevate.

är-höwl', recovered.

a'-rich. See *ar'-rik*.

âⁿ-rich'-tä, to report, to cause.

ar'-i-gh'l, organ.

ar'-i-gh'l-shp̄-ler, organist.

ar'-ik. See *ar'-rik*.

ä rin'ä, to recollect, to remember.

âⁿ-rî-rä, 1. to begin to stir, or to mix.

2. to affect, touching.

är'-i-yä, to irritate, to annoy.

är'-i-yär-lich, aggravating, irritating.

är'-i-yär-nis, irritation, vexation, aggravation.

ârk. See *âr'-rik*.

är-ken-nä, to know or to recognize.

är-kwik'-ä, to refresh; to renew.

är-kwik'-uñg, recreation, restoration of energies.

är-lâb'-nis, permission.

är-lañg'-ä, to reach, to attain.

är-lâ'-wä, to allow, to permit.

är-lē'-sä, to liberate, to save.

âr'm, 1. poor, destitute.

2. arm; a branch.

är-mâ'-na, to exhort; to remind.

ar-mâⁿ', army.

âr'-mer, pauper; *lit.*, a poor one.

ärm'-lich, poorly, miserable.

âr'm-loch, arm hole.

ärm-sē'lich, miserable, destitute.

âr'-müt, poverty, distress.

âr'n, harvest.

arnd'-lich, decent, proper.

är-nē'-ra, to support; to maintain.

ârnsht, in earnest.

âⁿ-rosk-tä, to become attached by rusting, or corroding.

är-ret'-ta, to save or rescue.

ar'-rik, very; *ar'-rik grös*, very large; *en ar'-ri-yer grös'-ser man*, a very large (or great) man; *en ar'-ri-yi kleⁿ-ni frâ*, a very small woman.

är-shaf'-fa, created; conceived.

ârsh, 1. just, only now.

2. first.

är-shtau'-nä, to astonish.

är-shtau'-lich, surprising.

ârts-nai', medicine, practice of medicine.

âr'-tüm, 1. legacy.

2. something received by heredity, or congenitally.

âⁿ-rû-fä, to accost by calling; to call upon.

â'-rum, 1. arm.

2. poor, poverty stricken.

3. lean, poor in flesh, indigent.

â'-rum-sē'-lich, miserable, wretched, destitute.

âr'-wä, 1. to inherit; to secure or obtain by transmission.

2. an heir; one securing a legacy.

âr'-wet, work, labor, occupation.

as, as, while, because.

âⁿ-sâ-gha, to announce.

âⁿ-sē'-fa, to soap in part; or as in a preliminary manner.

âⁿ-sēⁿ-na, to view, to behold.

âⁿ-sēn'-lich, respectable, pleasant to look upon.

âⁿ-set-sä, to set; set to hatch, or to rise.

âⁿ-set-t'lä, to begin to settle, or to attempt settlement in a place.

âⁿ-shaf'-fa, to provide, to secure for future emergencies.

âⁿ-shatⁿ, appearance; indication.

âⁿ-shain, appearance; prospects, or probabilities.

â^{n'}-shau-ä, to behold, to look at.
â^{n'}-shē-lä, to start to pare; to begin
 paring or peeling.
â^{n'}-shik-a, to behave; to conduct
 one's self.
â^{n'}-shla-ghä, to nail to anything; to
 post for public information;
 to notify.
â^{n'}-shlī-sä, to join to.
â^{n'}-shmēch-lä, to ingratiate by coax-
 ing or flattery.
â^{n'}-shmēch-lich, ingrating; pleas-
 ing, agreeable.
â^{n'}-shmī-ra, 1. to ingratiate one's
 self.
 2. to paint; to daub.
 3. to cheat, or betray.
â^{n'}-shnar-rä, to address in coarse or
 rude language.
â^{n'}-shpan-na, to hitch to, or before
 another.
â^{n'}-shpel-la, to pin fast to.
â^{n'}-shplit-ta, to start splitting; to
 begin a split.
â^{n'}-shprīt-sa, to begin to sprinkle, or
 squirt a liquid; to sprinkle a
 little.
â^{n'}-shpruch, a demand, a request.
â^{n'}-shpruñg, a start in running, a
 beginning in a run.
â^{n'}-shrau-wä, to secure by screwing,
 to attach with screws.
â^{n'}-shtä-la, to place new steel on
 the cutting edge of tools; to
 harden like steel.
â^{n'}-shtä-ä, to like, to agree with
 one's expectations.
â^{n'}-shtek-ka, to contract something
 contagious; to set fire to.
â^{n'}-shtel-la, 1. to appoint to a posi-
 tion, or office.
 2. to commit a wrong or injury.
 3. to behave, or conduct one's
 self.
â^{n'}-shtel liñg, an appointment, or
 office.

â^{n'}-shtel-luñg, an office, or position.
â^{n'}-sh.tif-der, an instigator.
â^{n'}-sh.tif-ta, to instigate, to urge.
â^{n'}-sh.tō'-sa, to join to; to connect;
 adjacent.
â^{n'}-shtraich-a, to paint, to cover
 with a liquid by means of a
 brush.
â^{n'}-shtraich-er, a painter.
â^{n'}-shtrik-a, to knit on to another
 substance or article.
â^{n'}-shū-a, to attach new parts to old
 shoes; to cover with new
 upper leather.
â^{n'}-sicht, view, aspect.
â^{n'}-tsai-cha, to indicate, to give a
 token, or prognostication.
â^{n'}-tsai-cha-s, a token or sign.
auf'-är-sh.tē'-uñg, resurrection.
aus, out, out of, from.
aus'-är-da, to become degenerate;
 to form a variety distinct from
 the original.
aus'-bī-da, 1. to notify to quit.
 2. to outbid—at a public sale.
aus'-brī'-a, to clean out by scalding.
aus'-bud'-sa, to clean out, to prune.
aus'-dau'-ra, to persevere, to main-
 tain.
aus'-dē-la, to divide, to distribute.
aus'-denk'-ka, to contrive, to devise.
aus'-dil-ya, to extirpate, to root out.
aus'-dī-na, to serve out a time.
aus'-drē-a, to wring out.
aus'-drē-er, clothes-wringer.
aus-drik'-lich, particularly, ex-
 pressly.
aus'-druk, expression, enunciation.
aus'-fal, 1. deficiency.
 2. a falling out; enmity.
aus'-fal'-la, to fall out, to disagree.
aus'-fä-ra, to appear as an eruption,
 to break out.
aus'-fä-ras, eruption—cuticular.
aus'-fä-riñg, eruption of the skin.
aus'-far-kä'-fa, to sell out.

aus'-fī-ra, to carry out, to prosecute a plan or scheme.

aus'-fran-s'ī-a, to fringe out, or to become fringed.

aus'-fres-sa, to eat all, to consume everything eatable.

aus'-gēⁿ, to go out; to become extinguished.

aus'-ge-dai'-ärt, exhausted, tired out.

aus'-ge-lärnt, completed education.

aus'-hal-dā, to sustain, or to hold out.

aus'-hē-la, 1. to heal to completeness.

2. to hollow out—as wood.

aus'-huñg-er-a, to starve out, to famish.

aus'-koch-a, to extract by boiling.

aus'-krat-sa, to erase, to remove by scratching or scraping.

aus'-lach'-a, to ridicule, to laugh at.

aus'-lā-fa, to expire—in time.

aus'-lē-gha, to explain, to demonstrate.

aus'-len-er, foreigner.

aus'-lē-ra, to empty.

aus'-lē-sa, to select; to pick out.

aus'-lesh-a, to put out; to extinguish.

aus'-mach-a, to reach conclusions, to make out, to obtain results.

aus'-mish-da, to clean out stables, to remove manure.

aus'-pak-kā, to unpack.

aus'-pik-kā, to pick out, as fruit or vegetables; to select and assort.

aus'-plan-tsa, to transplant.

aus'-plū-gha, to plow between rows of corn, etc.

aus'-rai-sa, 1. to abscond.

2. to tear out, to fray.

aus'-red, excuse, pretext.

aus'-ret, excuse, response.

aus'-rich-ta, to perform, to transact, to accomplish.

aus'-rot-ta, to weed out, to root out.

aus'-rū-fa, to announce in public; to exclaim, to cry out.

aus'-rū-gha, to recover by resting; to take rest sufficient to recover.

aus'-sau-fa, to drink out all.

aus'-sē-a, to sow.

aus'-sē-tsa, to plant, or set out.

aus'-shenk-ka, to pour out—(coffee or tea) at table.

aus'-shen-na, to reprimand, by making fun of; to cause one to feel ashamed.

aus'-shlek, sprouts or young shoots—on trees.

aus'-shlī-sa, to exclude, to lock out.

aus'-shprech-a, to pronounce.

aus'-shrai-wa, to write out; to complete by writing.

aus'-shtai-ar, outfit of furniture, etc., when going to housekeeping; furnishings.

aus'-shtai-gha, to dismount from a vehicle.

aus'-shlēⁿ, to bear, to endure.

aus'-shwenk-ka, to rinse out.

aus'-shwit-sa, to sweat out; to get rid of by sweating.

aus'-sicht, prospect, view.

aus'-tē-rīng, consumption, *phthisis*.

aus'-tā-rich'-ta, to transact or perform.

aus'-waich-a, to evade, to avoid.

aus'-wak-sa, to grow to maturity.

aus'-wärf-līng, an outcast; an imperfect one.

aus'-wen-ich, 1. outside.

2. to know a thing by heart.

aus'-wish-a, to rub out, to wipe out.

âⁿ-wai-sa, to instruct, to show, to indicate, to direct.

a-wek', away.

âⁿ-wend-möl, the Lord's Supper.

âⁿ-wen-na, to apply, to utilize.

a'-wer, but, only, otherwise, used as a threat to wish one to desist.

âⁿ-wick-lä, 1. to wrap upon, to connect by wrapping.

2. to accomplish by palming off upon another.

â'-w'r, but; used also as a threat to one who has committed a fault.

a'-w'r-glâ-wa, superstition.

a'-w'r-glâ-wish, superstitious.

b', a contraction of *ba*, *be*, used as a prefix and equivalent to the English prefix *be*.

bâⁿ, a path, a track.

bâ-âm^t-er, occupant of an office or public position; one elected to position by ballot.

bab'-ä-dek'l, paste board.

ba'-bâ-gâi, parrot.

ba-bir', paper; sometimes applied to newspaper.

bab'-lä, a poplar tree.

ba'-b'l-ä, to babble, to talk senselessly.

ba'-b'l-maul, one who talks too much, and senselessly; a tattle-tale.

bâbsht, pope.

bâ'-dä, to wade, to bathe.

bâ-dal'-yâ, battalion; muster day of the militia.

bäd'-er-ÿ's'l, partridge, quail (*Ortyx virginianus*).

ba-dä'-nuñg, office, service.

bâ-dô', a flat-bottom boat (a mackinaw, as used in British America).

bad'-rä, to bother, to annoy.

bü-drach'-ta, to behold or to view.

bü-dref'-fa, to concern, to affect.

bü-diñg'-a, to agree, to make terms.

ba-drof'-fa, confused, afflicted, affected.

büdt, a bath.

bä-fêl', command, an injunction.

bä-fê'-la, to command or charge.

ba-frai'-a, to deliver, to set free.

ba-frid'-ich-ä, to satisfy.

ba-frî-dich-ä, to pacify.

ba-frid-ich-uñg, satisfaction.

ba-gê'-ghna, to meet, to come toward one another.

bä-gêr', a request, a desire.

bä-gê'-ra, to request, or desire.

bä-gê'rich, desirous, greedy.

bä-gêr'-ich-kait, greediness, eagerness.

bä-gêr'-ich-kêt, greediness.

bä-härt'-sich-a, to take to heart.

bä-haup'-ta, to assert or maintain.

bä-hÿ'-ta, to protect, guard.

bâi, pie.

bâi, by, at, near.

bâi'-är'-ä-wä, co-heir.

bâi'-brîñg'-a, to bring from another place, to contribute.

bâi'-drâ-gha, to carry from another place, to contribute.

baich'-ta, to confess.

bâi'-d'l, 1. bolt used to separate flour.

2. scrotum.

bâi'-drik'-kâ, to press together, to squeeze.

bâi'-fal-la, to transpire, to occur.

bâi'-hō-la, to bring together, to fetch to a given point.

bâi'-kum-ma, to come together, to gather at a given point, fortuitously.

bâil, a hatchet.

bâi'-lä-fa, to walk together; to gather, on foot.

bâi'-lar, a pot or boiler.

bâi'-lê-gha, to lay up; to hoard or save; to lay aside.

bâim, with the, by the; contraction of *bâi dem*.

bâim-glê'-na, retail; *lit.*, "by the small."

bai-nâ', nearly, almost.

bai'-nâ-ma, nick-name; Christian name.

baind, pine, pine tree.

baind'-hârts, resin of the pine tree, exudation on bark of pine.

baindt, a pint.

baindt'-blech, a tin cup holding about a pint.

baindt'-mōs, pint measure.

baind'-tsab'-ba, pine cone.

bai-nō', almost, nearly, approaching to.

bai'-sâ, to bite.

bai'-sich, acrid, biting, sour.

bai'-shaf'-fâ, to provide, to procure.

bai'-shprîng-a, to run past, or by; to run to assistance.

bai'-shpîl, example, instance.

bai'-shlêⁿ, to support, to stand by.

bais'-tsa^{ng}, pincers.

bai'-wêk, by way.

bai'-wō-gha, to attend, to be present.

bai'-yâ-gha, to drive together, to herd or round up.

bak'-drōk, dough trough.

bak'-ka, 1. to bake.

2. cheeks (*sing.* and *pl.*).

bak'-ka-bârt, whiskers, beard.

bak'-ka-buch, pocket-book, purse.

bak'-ka-shtêⁿ, brick (*sing.* and *pl.*).

bak'-ka-shtêⁿ-lê'-gher, brick-layer.

bak'-ka-shtêⁿ-of'-fa, brick kiln.

bak'-ka-tsâⁿ, molar tooth; *lit.*, *bak'-ka*, cheek + *tsâⁿ*, tooth.

bak'-of'-fa, bake oven.

ba-kê'-ra, to convert.

ba-kê'-ru^{ng}, conversion.

ba-ken'-na, to confess, to make known.

ba-kend'-nis, conversion, acquaintance.

ba-kesh'-dich-a, to supply with food.

ba-kim'-er-lich, pitifully, poorly.

ba-kim'-ra, to concern one's self.

ba-klâ'-gha, to complain, to report.

ba-kand'-mach-a, to make known.

ba-kand'-mach-u^{ng}, acquainting with, advertisement.

ba-kand'-shaft, acquaintance, familiarity with a person or subject.

ba-klê'-da, to clothe.

ba-kref'-tich-a, 1. to assert vigorously.

2. to strengthen, physically.

ba-kum'-ma, to become, to agree with.

ba-kwem', commodious.

ba-kwem'-ma, to adapt, to become accustomed.

bal, soon, nearly.

ba'-lîbt, beloved, liked, popular.

bal'-ka, beam, joist.

bal'-lâ, ball.

bal'-la-britsh, a bat for playing ball.

bal-lûn', balloon.

ba-lô'-na, to reward, remunerate.

ba-lô'-nu^{ng}, reward, compensation.

bal'-sam, balsam.

bal-wî'-ra, to shave.

bal-wîr'-mes-ser, razor.

bal-wîr'-sêf, shaving soap.

bâm, a tree.

bâⁿ'-mach-a, to make a track or path; to cut or open a path through snow.

bam'-b'lich, loosely or carelessly.

bam'-b'l, a loiterer, a stupid fellow.

bam'-b'la, to loiter, to waste time.

bâm'-gar-da, orchard.

bâm'-mes'-ser, a pruning knife; *lit.*, a tree knife.

bâ-mî'-a, to concern one's self; to worry.

ban'-ât-baks, bonnet box.

band, 1. a hinge.

2. a band, bandage.

bân'-der, a panther.

bandt, 1. ribbon, tape.

2. a bond—legal instrument.

bâ-ne'-na, to give a name.

bü-n'-uñg, naming, denomination.

bañg, afraid, uneasy.

bañg'-a-net, bayonet.

bañg'-ich-ked, fear, dread, anxiety.

bank, a bench.

ban'-na, to charm, to captivate.

bap, paste.

bap'-pa, to paste, to stick to.

bär, 1. bear.

2. sometimes used instead of *bär'*, pear.

bâr, bare, denuded.

ba-râ'-da, to deliberate.

ba-rai'-a, to repent, to prepare for a future state.

ba-rai'-cha, to need, to require.

ba-rai't', prepared, ready.

ba-rai'-ta, to prepare, to make ready.

ba-rau'-cha, to stand in need of.

ba-rau'-shend, intoxicating, exciting.

bâr'-fî-sich, bare-footed.

bâr'-geld, cash.

bar'-gha-ment', parchment.

bâr'-gha-mot, bergamot.

ba-richt', a report.

ba-richt'-ta, to report, to make known.

bâr' ig, a hill, mountain.

bâr' ik, a boar.

bü'-rik, a hill, mountain.

ba-rik', a wig.

bü'-rik-bluk, a "hillside-plow," a plow for hilly country.

ba-rimdt', renowned, well known.

bar-ir'-iñg, emetic.

bar-ir'-uñg, emetic.

ba'-ri-ya, to borrow, to obtain credit.

bâr'-ka, birch.

bârl, a barrel.

bârl'-fas, a barrel; *lit.*, a barrel measure.

bâr'-mä-dik'-l, a pendulum—of a clock.

barm-härts'-ich, merciful.

barm-härts'-ich-kaît, merciful, the act of being merciful.

bâ'-ri-ich, hilly or mountainous.

bârshd, 1. a brush.

2. a bristle.

bârshd'l, a little coxcomb of a fellow; a synonym equivalent to the modern expression of "dude."

bârshd'-ta, 1. to brush, to clean off.

2. bristles, as of a hog.

bärts'-el, the coccygeal region.

barts'-el-a, to tumble, to frisk.

barts'-l bâm, sommersault.

bas, bass—a bass voice.

bâs, a boss, a chief, a master.

bash'-ta, to husk.

basht'-hel-s'l, stick for husking corn.

bas'm, opossum.

bas'-sa, 1. to fit, to suit; to measure to fit, as clothing.

2. to pace.

bas'-gâik, a bass viol; *lit.*, a "bass violin."

bash'-ta, 1. to husk.

2. husks, shuck.

basht'-art, bastard; hybrid.

basht'-hols, husking pin.

basht'-nât, parsnip.

ba-sin'-na, to consider, to make up one's mind.

bas'-sem, opossum.

bât-dö', a flat-bottom boat (*Fr.*, *bateau*). ?

ba-tsâr'-ik, district, circuit.

ba-tsâr'k', district, circuit.

bâtsh'-ler, an unmarried man, a bachelor.

bat'-sich, saucy, impudent.

bau'-a, to build, to construct.

bauch, belly, abdomen.

bau'-cha, to boil wash.

bauch'-fel-ich, decrepit, failing.

bauch'-grî'-w'la, an uneasiness in the intestines.

- bauch'-shmärt'-sa*, pain in the stomach, cramp.
bauch'-wē, stomach ache.
bau'-er, 1. a farmer.
 2. a builder.
bau'-hols, lumber.
bauch'-rī-ma, belly band or strap.
bauch'-tsu-wer, a wash tub.
bau'-er-a, to farm, to cultivate.
bau'-er-ai', a farm.
bau'er-ä-shtand, a farm with all its accessories, as a plant.
bau'-mēsh'-d'r, building master; contractor, architect.
baur, a farmer.
ba-wai'-sa, to show, to prove.
ba-wâ'-na, to inhabit, to live in, to occupy.
ba-wân'-er, inhabitant, occupant.
ba-wând', inhabited.
bân'-wol, cotton.
bân'-wol-lich, anything of cotton.
bēⁿ, leg (—*pl.*, *bēⁿ*).
bē'-a, to toast.
be-ant'-war-da, to answer for, or become responsible.
be-ant'-wart-ich-kait', responsibility.
be-ärd'-ich-ä, to bury, to inter.
beck, pitch, shoemaker's wax.
beck'-ich, pitchy, sticky or adhesive.
bed, a bed; a lair.
bēd, both.
bē'-dä, 1. both.
 2. to pray, to supplicate.
be-dai'-er-lich, pitiable.
be-dai'-ta, to indicate or signify.
be-dai'-diñg, signification; indication.
be-dai'-tuñg, signification; indication.
be-dan'-ka, to thank.
be-dau'.er-a, to pity.
be-dau'.er-lich, pitiful, that which may be pitied.
bēd'-dāk, thanksgiving day; *lit.*, prayer day.
be-där'-fa, to need, to want or require.
be-därf'-nis, necessity.
be-dau'-ra, to pity, to commiserate.
bed'-dep-ich, bed cover.
be-dek'-ka, to cover, to roof a house.
be-denk'-ka, to consider, to think or remember.
be-denk'-lich, serious.
be-dē'-na, to deserve; to attend to or serve in an office.
be-dē'-ner, a servant.
bed'V-a, to beg.
bed'-lät, bedstead.
bed'-lät'l, a small bedstead, a trundle bed. The more frequent term is *shī'-wer-lī'*.
bed'V-man, beggar.
be-drâ'-gha, to conduct, to deport, to behave.
be-drē'-ya, to betray, to cheat.
be-drib', sorrowful, distressed.
be-dri'-gher-ai, deception, swindling.
be-dri'-gh'l-lich, deceptive.
be-drik-lich, deceptive.
be-dri'-wa, 1. to make sorry, or to cause distress.
 2. to cheat, impose upon.
be-druk, fraud.
bed'-shtrik, bed-cord.
bed'-tsich, a case for feathers, feather-bed.
be-fin'-na, to find.
be-fol'-ya, to obey, to observe.
be-frō'-gha, to ask, or to inform one's self.
be-glē'-da, to clothe.
be-glik'-ka, to happen to, or to make fortunate.
be-gin', beginning, commencement.
be-gnē'-dich-a, to pardon, to befriend, to favor.
be-gnē'-dich-kait, mercy.
be-grai'-fa, to grasp, to comprehend.
be-graif'-lich, conceivable, comprehensible.

- be-grâ'-wa*, to bury.
be-gük'-ka, to look at, to look over, to inspect.
be-grëb'-nis, a burial, a place of burial.
be-grif', comprehension.
be-haup'-ta, to assert, to maintain.
be-hel'-fa, to make shift, to help one's self.
be-hë'-fa, to behave, to deport.
be-hëf'-lich, with deportment, com-
 plaisant.
be-hal'-da, beholden.
be-henk'-ka, to bedeck, to put on an
 extra quantity of finery.
be-hoft', afflicted.
bek, peck.
be-kandt', known, acquainted, fam-
 iliar.
bek'-är, a baker.
bel, a bell.
bël, bail, security.
be lai'-dich-a, to annoy, to worry.
bel'la, 1. to ring a bell.
 2. to tattle, to relate to gos-
 sips.
be-lësh'-da, to burden; to impose
 upon.
be-läⁿ'-na, to reward, to recom-
 pense.
be-ti'-gha, to belie.
bel'-li-gots, a term applied to com-
 mon molasses candy. Was
 formerly used in and around
 Reading.
be-ti'-wa, to beloved.
be-löbt', liked, beloved.
be'-luk'-sä, to cheat, to fool, to belie-
bels, a thick matted growth of hair.
bels'-nik-el, Santa Claus; a grotesque
 figure assumed by the young
 in making visits on Christ-
 mas-eve.
bel'-tsa, to pelt, to lamm, to beat.
bel'-tsa-bup, Beelzebub, demon.
bëm, trees; *pl.* of *bâm*—tree.
be-mär'-ka, to note, or observe.
be-mär'-i-ka, to note, to observe.
dem'-bla, to fool away, to idle, to
 squander.
be-nâ'-ma, to name; to give a
 name.
ben'-di, Bantam fowl.
bend'^l, a string or twine.
be-ne'-w'lt, befogged; intoxicated.
beñg'^l, a robust, overgrown boy.
benk, 1. a bank for deposit of mo-
 ney; a bank of earth.
 2. *pl.* of *bank*—bench.
ben'-ni-cha, to overcome or to sub-
 due.
be-nöch'-rich'-tich-a, to notify, to
 make known.
ben'-rail, pennyroyal.
bens, a cent, penny.
be-nut'-sa, to benefit, to use.
be-röd'-shla-gha, to deliberate, to in-
 terchange views.
bēs, angry, cross.
bē'sä, a broom.
bēs-dīng', a felon; *lit.*, bad thing.
bē'-sem, a broom.
besh'-d'la, to tinker, to plaster.
besh't, best.
be-shür', to be sure, certainly.
bes'-'r, better.
bes's'r-a, to better; to improve.
bet, a bed.
bet'v-a, to beg, to solicit.
be-trä'-ghas, conduct, deportment.
be-richt'-ich-a, to correct, to report
 correctly.
be-tsâ'-la, to pay, to remunerate.
be-wais', proof.
be-wais'-sa, to prove, to illustrate.
be-wâ'-ra, to protect, or to shield.
be-wö'-gha, to move, to budge.
be-wö'-ghlich, unable.
be-wö'-ghuñg, motion, exercise.
be-yam'-ra, to bemoan.
be-yâ'-wa, to affirm, to state affirm-
 atively.

- b'fal'-la*, to befall.
bfesh'-dich-a, to fasten, to secure.
bfv'-la, to feel.
bfün'-na, to find one's self, state of health; to find in place.
bīb'-cha, 1. a very small boy; diminutive of *bū*—boy.
 2. a chick—of domestic fowl.
bīb'-'l-chia, chick—of domestic fowl.
bich'-er, books; *pl.*, of *buch*.
bid'er, bitter.
bid'-man, a lever, connected with an eccentric.
bid'-rā-tsā-lād, dandelion; *lit.*, bitter salad.
bidsh, a bitch, slut.
bidt, a bid, or offer.
bif'-'l, a hornless cow.
bī'-gha, to bend; to incline by bending.
bī'-gh'l-a, to iron, with a flat iron.
bī'-gh'l-ai'-sa, a flat iron—sad iron.
bik'-ka, to bend or bow, to stoop.
biks, a rifle.
bild, a picture.
bin, am; I am—*ich bin*.
bin'-d'l, a bundle.
bin'-na, to tie, to bandage.
bīr, a pear; beer—applied also to lager beer.
bīr'-hēf, yeast.
bīs, 1. a bite.
 2. till, until.
bīs'-el, a little.
bīsh'-el, a small bush, a shrub.
bīsh'-op, a bishop.
bīsh't (contraction of *bīsh't dū*—are you), are, art.
bīs'-kats, a skunk, polecat.
bīs'-kat-sa-kraut, skunk cabbage.
bīs'-'l, a little.
bīs'-sā-bel, dandelion.
būt'-da, 1. to supplicate, to ask, to beseech.
 2. to bid, as at a sale.
bitsh, a bitch, slut.
- bī'-wi*, a pewee (*Contopus virens*).
bī'-w'l, Bible.
blād, a leaf.
blads, a place.
blaf'-fa, to bark.
blai', lead.
blai'-ā, leaden.
blai'-wā, to stay or to remain.
blai'-wais, white lead; as white as white lead.
bla'-kū, a spot; a patch.
bläk'-ā, to blacken.
bläk'-bi-ra, blackberries.
blan-dāsh', plantation.
blan'-tsü, to plant, to inoculate.
blär'-rā, to bleat as sheep, to bellow, as calves.
blash'-der, a plaster.
blash'-der-ā, to plaster.
blash'-der-er, a plasterer.
blats, a place.
blau'-der-ā, to converse, to tattle.
blaum, plum.
blech, tin.
blēch, pale.
blē'-chā, to bleach.
blech'-ē-mer, a tin bucket.
bled'-cha, a saucer.
bleds'-lich, immediately, suddenly.
blöd't, bashful, diffident; weak.
bled'-ter, leaves; *pl.* of *blād*.
blek'-'l, a small spot, or patch.
ble-sīr', pleasure, gratification.
ble-sīr'-lich, pleasantly.
blēts, places; *pl.* of *blads*.
ble'tshā, to smack with the flat hand.
bū'-a, 1. blossoms—refers chiefly to fruit trees.
 2. to bloom.
bū'-a-knep, buds; flower buds.
blits, lightning; a flash of lightning.
bū'-ent, blooming.
blig, plows; *pl.* of *bluk*, or *blug*.
blīk'-a, to glance; to peep at momentarily.

- blind'-a-mai'-s'l*, blind-man's buff ;
a game played by the young.
- blind'-hai't*, blindness.
- blind'-half-ter*, blindhalter, blinkers.
- blindt*, blind.
- blind'-ts'la*, to wink.
- blit'-sa*, lightning ; to flash, as lightning.
- blō*, 1. blue.
2. indigo, "bluing."
- blo-bärg'*, Blue mountain—a range in Eastern Pennsylvania.
- blo-bär'-yär*, an inhabitant of the regions of the Blue mountains.
- blō'-der*, a blister.
- blō'-der-a*, 1. to blister.
2. to tattle, or scatter gossip.
- blō'-fogh'l*, blue bird (*Sialia sialis* Bd.).
- blō'-hūsh-da*, whooping cough. From *blo*, blue, and *hūsh'-da*, cough ; denoting the color of the face during paroxysm.
- blok*, a log.
- blok'-hai'-s'l*, a log cabin.
- blok'-haus*, log house.
- blōs*, 1. bare ; only.
2. a blister.
- blō'-sä*, to blow.
- blōs'-balk*, bellows.
- blot*, bare, denuded of covering.
- blot'-kep-ich*, bare-headed ; bald-headed.
- blot'-sa*, to jump or jar, as in a carriage, or on horseback, in going over rough soil.
- blūd*, blood.
- blū'-da*, to bleed.
- blūd'-ich*, bloody.
- blüd'-suk'l-ar*, a leech ; *lit.*, blood-sucker.
- bl'üd'-war-tsel*, blood root (*Sanguinaria canadensis*).
- blug*, plow.
- blū'-gha*, to plow.
- blu'-mä-ken'-er*, a botanist.
- blu'-mä-krants*, a wreath of flowers.
- blu'-ma-shtraus*, a raceme, a sprig of flowers ; nosegay.
- blūt*, blood.
- bob'-'l*, a baby.
- bod'-bâi*, potpie.
- bod'-esh*, potash.
- bod'l*, bottle.
- bod'-'l-chia*, a vial or small bottle.
- bod'-'l-i*, a vial ; used sometimes by the illiterate.
- bod'-ta*, bottom, the ground or earth.
- bod'-'m*, the ground, or earth, bottom.
- bof'-la-haut*, buffalo robe.
- bō'-gha*, a bow, a curve.
- bō'-gha-flänt*, bow-gun—cross bow.
- bok*, buck ; ram.
- bōn*, bean.
- bōn'-na-grai'-t'l*, summer savory.
- bōn'-nä-shtok*, bean pole.
- bō'-ra*, to drill, or to bore.
- bōrd*, 1. a board.
2. boarding, meals.
- bōrd'-kär-ich*, the gallery in a church.
- bōrdt*, board.
- bos*, a kiss.
- bos'-sä*, to kiss.
- bot'l*, bottle
- bran'-de-waiⁿ*, whisky.
- bräf*, good, of excellent deportment, brave.
- braf'-it*, profit, gain.
- brai*, pap.
- brai'-di-gam*, bridegroom.
- brand*, ergot.
- brandt*, 1. mortification, gangrene.
2. brand, firebrand.
- brandt'-shtif-ter*, an incendiary.
- bral'-la*, to brag, to boast.
- bral'-ler*, a braggart.
- brat'-s'l-a*, to sputter, sputtering.
- brau'-a*, to brew.

brauch'-a, 1. to need or require.

2. to exorcise, or, to perform ceremonies for driving out disease, spells, witches, etc.

brauch'-bär, serviceable, useful.

braud, bride.

brau'-er, brewer.

brau'-er-ai', brewery.

braut, bride.

*brau*ⁿ'-war-tsel, figwort.

brech'-a, 1. to vomit.

2. to break in—to harness.

brech'-loch, furnace for drying flax.

brecht'-ich, splendid, elegant.

bröd'-baül, broad axe.

bröd'-ich, a sermon.

brö'-dich-a, to preach, to deliver a sermon.

brö'-dich-er, a preacher; parson.

*bröd*t, broad, wide.

brök'-'la, to crumble.

bröm, horse fly.

brön'-dis, apprentice, a beginner.

brön'-ē-s'l, stinging nettle.

brön'-nä, to burn, to scorch.

brön'-ner-ai, distillery.

brö'-ting, braiding.

brü, juice, sap; any liquid of worthless character or questionable composition.

brü'-a, 1. to scald, to parboil.

2. to hatch.

brü'-der-hait, brotherhood.

brü'-der-lich, brotherly, amicably.

brü'-ich, juicy, of a liquid consistence.

brüf, a letter.

brü'-gh'l, a club.

brük, bridge.

brül, spectacles.

brül'-la, to cry, to weep, to roar.

brüht, breasts—*mammæ*; *pl.* of *brusht*.

brüht, a priest.

brüsh'-ter, priest, a prelate.

bröd, bread.

bröd'-hank, a hanging shelf for food.

bröd'-tä, to fry, to roast.

bro'-fit', profit, gain.

brök'-el, a crumb, small fragment.

bruch, 1. a rupture, hernia.

2. a quarry—either stone or ores; a generic term.

bruch'-bandt, a truss, used for application in hernia.

brud'-'l-ä, to simmer, to pout.

brüd'-er, brother; *pl.*, *brü*'-der.

brü'-der-hait, state of feeling, or affection, between brothers.

brud'-sich, one apt to pout; cross, discontent.

brüdt, a brood, a litter.

brud'-tsä, to pout.

brum'-'la, to grumble or murmur, to mumble.

brum'-ma, to hum, to buzz.

brum'-mer, 1. a steam whistle—usually applied to such as is found at factories, to announce beginning and ending of working hours.

2. a bull-roarer—boy's toy.

brun'-na, a well.

brun'-na-ēⁿ-mer, well bucket.

brun'-na-wals, a windlass, for drawing water.

bruns, urine.

brun'-sa, to urinate.

brusht, breast, thorax; applied to either one of the mammæ of a woman.

brusht'-lap-pa, a vest.

brusht'-wärts, a nipple, of one of the mammæ.

bsan'-ders, particularly.

bsar'-ya, to be solicitous; to provide for.

bsed'-sa, to trim; to arrange by trimming, or placing.

bsed'-suñg, trimming.

bshai'-sa, to cheat, to deceive.

bshē'-dich-a, to injure.

- bshenk'-a*, to make a present of, or to give freely.
- bshim'-ba*, to disgrace, to insult.
- bshis'-ser*, one who cheats, or is dishonest.
- bshlō'-sa*, to conclude, to close up, or bring to an end.
- bshlus*, conclusion; resolution, decision.
- bshmai'-sa*, to throw up, to pelt.
- bshla'gha*, to shoe—as a horse; shod.
- bshlō'-la*, to rob.
- bshlōl'-la*, to order, to commission.
- bshlōl'-luñg*, a position or office.
- bshlō'-tich-a*, to confirm or certify, to affirm.
- bshlō'-la*, robbed. A person is said to be *bshlō'-la*, when he is of a thieving nature.
- bshwē'-ra*, to swear with another, before giving testimony.
- bshwēr'-lich*, with difficulty.
- bshid'-sä*, to possess, or occupy.
- bshid'-ser*, occupant, owner.
- bshin'-na*, to consider, to deliberate before making up one's mind.
- bshuch*, visitors, company; visitation.
- bshuch'-a*, to visit, to call upon.
- bshun'-ders*, particularly.
- bshun'-na*, having presence of mind; decided.
- bū*, boy.
- buch*, book.
- bū'-cha* beach.
- bū'-chel*, beach.
- buch'-shank*, book case.
- buch'-wē-tsa*, buckwheat.
- bud'-d'r-fas*, churn—for making butter.
- bud'-sa*, core, as of a boil.
- bud'-sa-man*, scare-crow, as erected in the field to scare off birds.
- buds'-ich*, insignificant, small, stumpy.
- bud'-ter*, butter.
- bud'-ter-blum*, buttercup (*genus Ranunculus*).
- bud'-ter fo'-g'l*, reed bird; *lit.*, butter bird.
- buk'-er*, a rascal.
- buk'-ker*, a rascal.
- buks*, box — ornamental garden shrub.
- buks'-bī'-rā*, teaberries; fruit of winter green.
- bumb'-ba*, to pump.
- bum'er-ants*, tomato.
- bum'-ert*, orchard.
- bump*, a pump.
- bum'-pa*, to pump, to exhaust.
- bun'-d'l*, a bundle.
- bun'-d'l-a*, 1. to bundle, or tie up in a bundle.
2. The custom of bundling formerly practiced in New England, and various portions of Pennsylvania.
- bung'-ard*, orchard.
- bush*, woods, forest. This word is sometimes used to designate the rural districts.
- bush'-knip-p'l*, a rustic; a country gawk.
- bush'-man*, countryman, one from the rural districts.
- bush'-tâb*, letter of the alphabet.
- bush'-ta-wī'-ra*, to spell.
- bush'-dâ'-wā*, letter of alphabet, character.
- bus'm*, bosom, breast.
- bus'-si*, cat.
- butsh'-er*, a butcher.
- butsh'-er-a*, to slaughter, to "butcher."
- butsh'-er-aks*, a cleaver.
- butsh'-er-mes'-ser*, a carving knife.
- bū'-wa-lais*, tickweed.
- bū'-wa-lī*, a little boy.
- bu^w-wol*, cotton.
- bu^w-wol-la*, made of cotton, cotton goods.

buⁿ'-wol-lich, having the appearance or property of cotton.

d', 1. from *dā, de, do*, here.

2. from *du, dū*, thou, you (*sing.*).

da, exclamation, signifying, there now, there you have it, take it.

dāb, deaf.

dab'-ich, clumsy, awkward.

dab'-pa, 1. prints—as foot-prints; impressions.

2. to walk about aimlessly.

dach, roof.

dach'-fārsh, ridge pole.

dach'-fensh-ter, dormer window.

dach'-kan-d'l, rain gutter, rain spout.

dach'-lā-da, hatchway; *lit.*, roof shutter.

da'-di, father, "daddy."

dad'-'l-daub, turtle-dove.

dā'-fā, to christen, to baptize.

da-för', in favor of.

da-fun', from it, from that, therefrom.

dafun'lāfa, to go or walk away from; to leave.

dāf'-shaiⁿ, certificate of baptism.

däg, day.

däg'-dāb, a scoundrel.

dā'-gha-bruch, daybreak.

däg'-len-er, a laborer, one who works by the day.

da-hēm', at home.

daich, a narrow gully; sometimes applied to a deep valley or ravine.

daich'-'la, conduit, drainage or sewer pipes.

dai'-er, costly, dear.

daiks'-'l, a wagon tongue.

dait'-lich, distinct, clearly.

dai'-ter, a pointer. Formerly, school-books were used to which a string was attached, having at the other end a sharpened piece of whalebone, to be used as a pointer.

daitsh, Dutch, German.

dai'-w'l, devil.

dai'-w'l-ā, "to devil"—to annoy and worry.

dai'-w'ls-drek, assafoetida.

dāk, day.

dāk'-lāⁿ, daily labor.

dāk'-len-ar, day laborer.

dāks'-wār, day's labor.

dāl, valley.

dā'-ler, dollar.

dal'-yā, dahlia.

dāl'-rōs, aster, chrysanthemum.

dam, dam.

dam'-mā, to dam; to obstruct.

damp, vapor, steam.

dam'-pā, to steam.

dām'-pā, to dampen, to moisten.

dan, then.

dank'-ka, to thank.

dank'-bār, thankful; grateful.

dānk'-bār, thoughtful, considerate.

dānk'-bār-kēt, thankfulness, with gratitude.

dan'-ser, a dancer.

dap'-per-a, to hasten, to hurry.

dar, tar.

dār, 1. dry, cured.

2. lean, skinny.

3. the.

dā'-rā, to dry, to cure.

dār'-ā-bā-din', turpentine.

dār'-bā-din', turpentine.

dar'-'ch-lāf, diarrhoea; *lit.*, "through walk." The literal translation has actually been used in conversation, to designate the complaint.

darchs, through the; contraction of *dar'ich des*.

dar'-'ch-sē'-na, to see through ; to comprehend.

dar'-'ch-waks, boneset.

dar'-'ch-wek', throughout.

dār'em-sēd, "cat-gut" string, sinew cord.

dār'-fa, to dare, to challenge, to be permitted.

dar'-ich, through.

dar-īch-aus', throughout; generally; by all means.

dar'-ich-brīng-a, 1. to bring through.
2. to squander.

dar'-ich-gēⁿ, to pass through. Is used, generally, in the sense of escaping or running away.

dar'-ich-ge-widshl', slipped through; escaped.

dar'-ich-nan'-ner, mixed ; confused.

dar'-ich-sicht-lich, transparent.

dar'-ich-such'-ā, to search, to examine, to ransack.

dar'-ich-tswēng'-a, to force through.

dar'-i-gh'l, stagger, faintness, vertigo.

dar'-i-gh'l-a, to stagger, to reel.

dārm, intestine, gut.

darm'-lich, giddy, dizziness.

darn, thorn.

darn'-ich, thorny, prickly.

darshd, thirst.

darsh'-dīch, thirsty.

dārt, there, at that place.

dārt-rum', therefore, for that reason.

da-rum', therefore, for this reason.

das, that.

dāt', deed, act.

dāt'-tum, date.

dū-tswīsh'-ā, between.

daub, dove, pigeon.

dau'-ba, barrel staves.

dau'-er-a, to pity ; to have compassion for.

dau'-ra, 1. to endure, to last.

2. to pity or to have compassion for.

daur'-haft, durable.

da-we'-der, against.

deb'-ich, a quilt, or bed cover.

dē'-dīch-a, to cause death.

dē'-ghlich, doughy, tough.

dē'-ghlich, daily.

dēk, dough, a plastic mass.

dek, a cover.

dek'-bet, bed cover ; coverlet.

dek'-ka, to cover, to roof.

dek'-l, a cover or lid of a box, kettle, etc.

dēk'-lich, daily.

dek'-s'l, an adze, to cut with an adze.

dēl, a part.

dē'-la, to divide, to share.

del'-ler, a plate.

dem, to this, to this one, to him.

dē'-mandt, diamond.

dem'-a-grāt, democrat.

dem'-e-dī, timothy.

dē'-mī'-tich, humble, depressed.

dem'-pa, to dampen.

dēng'-el-a, to sharpen scythes by hammering.

dēng'-l-ai'-sa, an elongated wedge-shaped iron, one end being driven into a log of wood, and the other used to sharpen scythes by hammering the cutting edge.

dēng'-l-shtok, a wedge-shaped piece of iron used in sharpening scythes by hammering.

de-nē'-wa, on the side of, beside.

denk'-ka, to think.

denk'-ki, thanks, thank you.

den'-na, to these.

den'-sør, dancer, dancers.

dør, door.

der, he.

der-för', in favor of.

des, this.

des-glaich'-a, the like.

dest, desk—writing table.

döl, part.

- dē'-mī-tīch*, downcast, despondent.
dē'-mūt, despondence, down-heart-
 edness.
dē-tsū', to that, likewise, also.
dī, the (*fem.*), also before plural or
 collective nouns, this one
 (*fem.*).
dīb, thief.
dīb'-'l-a, to spot, or cause to be
 marked with spots.
dīb'-lich, spotted, speckled.
dīb'-shtal, a resort of thieves.
dīch, thee, you.
dīds, teats.
dī-fen'-d'ra, to defend, to protect.
dīk, thick.
dīk'-sek-īch, "big bellied."
dī'-ma-dī', timothy.
dīn, thin.
dī'-na, to serve.
dīn'-da, ink.
dīn'-da-glās, ink bottle.
dīng, thing.
dīng'-a, to hire, to secure for ser-
 vice.
dīnsht, service.
dīnsht'-mād, female servant.
dīnsht'-māt, female servant.
dīr, 1. door, gate.
 2. an animal.
dī'-ra-shō', menagerie.
dī'-ra-shtep, doorstep.
dī'-ra-shuel, door sill.
dīr'-shtep, door step.
dīsh, table.
dīsh'-d'l, thistle.
dīsh'-'dr-a, to quiet, to soothe.
dīsh'-dūch, table cloth.
dīts, teats.
d'-nō', then, afterwards.
dō, here, at this place.
dō'-ba, paws.
dōb'-'l-a, to double, to fold.
dōb'-'lt, double, twofold.
dōb'-pa, a hank; this term is used
 in reference to flax, etc.
- doch*, though, although, yet, in-
 deed!
doch'-der, daughter.
doch'-der-man, son-in-law.
dōd, dead, death.
dō'-da-bâr, bier for supporting coffin.
dō'-da-glëdt, shroud.
dō'-da-wa'-gha, hearse.
dok'-ter, doctor, physician.
dok'-ter-a, to practice medicine.
döl, toll, a tax.
dol'-metsh-er, interpreter.
do-mīt', herewith, therewith.
dō'-mols, at that time, in those times.
don, then.
dör, gate, door.
dōs, a dose.
drach, dragon, will o' the wisp,
 elf fire, *ignis fatuus*.
drach'-a-loch, dragon's hole or cave;
 a cave.
drâ'-gha, to carry, to support.
drai', three.
drai'-aïng-k'l, musical instrument of
 steel (or iron), a triangle.
drai'-dre-dāich, three threads or
 strands; three-ply.
drai'-ek, triangle.
drai'-ek-īch, three-cornered.
drai'-wä, to drive, to force.
drai'-wer, driver, coachman.
drai'-yēr-īch, a three-year old.
drâm, dream; trance.
dram, rum.
drâ'-ma, to dream.
drân, fish oil, train oil.
drank, trunk.
drau'-ä-, to marry.
draub, grape.
drau'-er-luīt, mourners.
drau'-'ra, to mourn.
drau'-'r-īch, mournful, sad.
draus, out, on the outside.
drau'-wa-rank', grape vinè.
drai'-ta, to trot.
drê, a crank, or handle to churn.

- drē' -ä*, 1. to turn, to churn, to twist.
2. to threaten.
- drē' -ar' -i' -ghel*, a hand organ.
- dre' -bank*, turning lathe.
- drech' -der*, a funnel.
- drech' -ter*, a funnel.
- drech' -ter -blum*, morning glory; *lit.*, a funnel-flower; *i. e.*, a funnel-shaped flower.
- drech' -ter -kuch' -a*, funnel cakes. A thin dough put into a funnel having a long handle, and the dough allowed to run into a pan of hot lard, moving the funnel spirally over the surface so as to make a long spiral cake.
- drēd' -pau -er*, tread-mill, a pedal to cause power for turning light machinery.
- dred' -t' l*, a treadle, a pedal.
- dref' -fa*, to hit.
- dref'ts*, tares (or cheats) growing with grain.
- drē' -hend' -l*, a handle, for turning or churning.
- drek*, dirt, dust; mud.
- drek' -ich*, dirty, soiled.
- drep*, step; stairs.
- drep' -s' l -a*, to trickle, or to fall in drops.
- dresh' -a*, to thrash—as grain.
- dresh' -den'*, the thrashing floor of a barn.
- dresh' -der*, worthless residue.
- dresh' -fle -gh' l*, flail—thrashing flail.
- dresh' -ma -shin*, thrashing-machine.
- drē' -ta*, to kick, to tread.
- d' r -fōr*, in favor of; for it, or them.
- d' r -fun*, from it, of it; away from.
- drib*, dim, cloudy, misty; coated with an opaque film.
- drib' -säl*, sorrow.
- drik' -ka*, to press, to squeeze.
- drik' -nīng*, dryness, drouth.
- dril' -la*, 1. to drill, to muster for practice.
2. to drill with an instrument.
- drin*, in, within, inside.
- ärit' -' l*, a third; a widow's portion or dower.
- drī' -wa*, over, on the other side.
- drī' -wa*, to regret, to be sorry.
- drī' -wer*, over, across.
- drob' -pa*, drop, drops.
- drob' -sa*, to drop, or to fall by drops.
- drök*, trough.
- drol' -la*, a lope—an easy gait.
- drop' -sa*, to drop, or fall by drops.
- dros' -' l*, trestle.
- dröt*, wire; wax-ends as used by cobblers.
- dröt' -gärn*, shoemaker's thread.
- dröt' -tsaäng*, pliers, pincers.
- drol' -wa*, up, on the top, above.
- drö' -wer*, a drover.
- drub*, troop, herd, drove.
- druf*, on it, upon,
- druf' -gshnabt*, died, equivalent to the common expression of "slipped up," when referring to the death of anyone.
- druk' -ka*, 1. to | rint.
2. dry.
- druk' -er*, printer.
- druk' -er -ai'*, printing office.
- druk' -ka -del' -ter*, dandruff, dry tetter
- drum*, a drum. Also a drum used for heating rooms on floor above that in which the stove stands.
- d' rum'*, therefore. Contraction of *da -rum'*.
- drum -bēt'*, trumpet.
- drum' -ma*, to drum.
- drum' -säk*, cross-cut saw.
- drun' -na*, down, below, among.
- dū*, thou, you (*sing.*).
- dūⁿ -a*, to do, to accomplish.
- dub' -lich*, spotted, marked with small spots.

duch, cloth.
dū-d'l-sak, bag-pipe.
dud'-s'nt, dozen, the twelfth.
duk'-mē-sich, sneaking, deceitful.
du'l'-la-bân, tulip.
dum, stupid, ignorant; dumb.
dum'-bich, close, damp, humid.
dum'-hē-da, stupid tricks, nonsense.
dum'-kop, block head.
dum'-l, haste, hurry.
dum'-la, to hasten, to hurry.
dun, a ton.
dunk'-er, one who dips or immerses.
 Applied to the Dunkards, a religious sect.
dunk'-es, gravy, juices of meat.
dunk'-ka, to dip, to immerse.
dunk'l, dark, obscured.
dun'-ner, thunder.
dun'-ner-a, to thunder.
dun'-ner-wet'-ter, thunder storm; *lit.*, thunder weather. Is used as an oath.
dunsh't, vapor, humidity.
dunsh't'-ich, humid.
dush'-der, dusk, twilight.
du'-wak, tobacco.
dū'-wak-sak, tobacco pouch or bag.

ēⁿ, a, one.
eb', before, whether.
eb'-bas, something, a little, anything.
eb'-ber, some one.
eb'-r, some one.
ēch'-ä, oak.
ēch'häs, squirrel; *lit.*, oak rabbit.
ēch'-l, acorn
ēch'-la, 1. oak; frequently used instead of *ech'ä*.
 2. acorns, *pl.* of *ech'l*.
e'därn, hoarhound.
ed'-lich-a, some, several, few.
ēdt, an oath, a vow.
ē'-er, rather, sooner.
ēⁿfuch, single, singlefold.
ēⁿ-fech-ich, singly.

ēⁿfeld-ich, silly, foolish,
ef'-ent'-lich, openly, public.
ef'-na, to open, to develop.
ef'-nīng, an opening.
ēg, a harrow.
ē'-gū-sin'-ich, obstinate, willful.
ē'-gū-sin'-ish, obstinate, self-willed.
ē'gel, disgust, dislike.
ē'gel-haft, to have dislike, or disgust.
ē'-gel-hefd'-lich-kait, loathsomeness.
ē'-ghe-na, to own; to possess.
ē'ghen-er, an owner.
ē'-gh'l-a, to nauseate.
ē'-gh'l-ich, nauseating, disagreeable.
ek, corner.
ēk, a harrow,
ēk'-ich, cornered.
ek'-shank, corner cupboard.
ek'-sh'tēⁿ, corner-stone; diamond form.
ek'-sh'tēⁿ-nich, checkered.
ēl, 1. oil.
 2. ale.
ē'-la, to oil.
el'-bō-gha, elbow; an elbow of stove pipe.
el'-der-a, parents.
eldt, age.
ēl'-duch, oil cloth.
ē'-lendt, misery, trouble, distress.
ē'-lend-ich, 1. wretched, miserable.
 2. in poor health.
el'-fa, eleven.
ē'-lich, oily, having an oily surface.
el'-i-fandt, elephant.
ēl'-licht, oil lamp.
ēl'-sh'tēⁿ, oil stone.
em, 'm, to, to the (—*masc.*) to him, with him.
ēm, to one (denotes possession).
ēⁿ-mer, bucket, pail.
ē'-mer-henk, bucket handle.
ēⁿ-mer-rēf, a bucket hoop.
ēⁿ-mol, once, one time.
e-mōl', once on a time, at one time.

end'-kai-t'l, the inferior portion of the colon; the large intestine used for pudding (sausage) casing.

end'-lich, finally.

ēn'-ner, one (used before, or referring to masculine); applied to a man in disrespect, when the name is not to be mentioned.

en'-er-a, to alter, to change.

ēñg, tight, close.

ēñg'-brish tich, asthmatic; *lit.*, tight-breasted.

ēñg'-el, angel, angels.

ēñg'-'l en'-er, Englishman.

ēñg'-lish, English.

ēñg'-lish-salts, epsom salts—sulphate of magnesia.

ēn'-nē, one, she (*fem.*).

ēn'-nich, friendly, agreeable with another, or on good terms.

ēn'-nich-er, any one (*masc.*).

ēn'-nich-i, any one (*fem.*).

ēn'-nich-ep'-er, any body, any one.

ēn'-nich-ep-es, anything.

en'-k'l, grand-son.

en'-k'lin, grand-daughter.

enk'-shter-ich, alarmed, alarming; fearful, anticipating trouble.

ēr, 1. ear of grain.

2. honor, respect.

ēr'-ra, to honor, to respect.

ēr'-lich, honest.

ēr'-tum, legacy.

ēns, one.

ent, duck.

en'-ter-ich, drake.

ēr'-tea, to address one with "īr."

es, it.

ēn'-sai-dich, one sided; of one opinion.

esh, ashes; ash tree.

esh'-a-mid-woch, Ash-Wednesday.

esh'-ba, aspen.

es'-ich, vinegar.

ēs'l, a mule; used sometimes as a term of derision.

es'-sā, 1. to eat.

2. food, provisions.

es'-sach'-a, eatables, food.

es'-shank, pantry.

es'-shtub, dining room; *lit.*, eating-room.

ē'-wa, even, level.

e'-wā, just, whether, if, though, because; the true rendering is difficult to present, and can only be understood by the context.

e'-wā-f'il, immaterial, unconcerned.

e-wail', meanwhile; a short time.

e'-war, 1. a boar.

2. before he, whether he (from *eb ar*).

e'-wer-sich, upwards.

ē'-wich, ever, always, eternal.

ē'-wich-kait, eternity.

ē'-wich-rot'-ser, glanders.

fā'-b'l, fable, tale.

fa-brik', fabric, edifice, factory.

fā'-da, thread.

fā'-dem, thread, fibre.

fa'-der, father.

fak'-'l, a torch.

fa'i'-ar, fire.

faiv'-ar-a, 1. to celebrate; to keep holiday.

2. to start a fire, or to "fire up."

faiv'-ar-bà'-na, kidney beans.

faiv'-ar-brandt, fire brand.

faiv'-ar-dàk, holiday.

faiv'-ar-fo'gh'l, fire fly; *lit.*, fire bird.

faiv'-ar-hàrt, fire hearth.

faiv'-ar-ich, fiery.

faiv'-ar-lich, solemn.

faiv'-ar-lich-kéd, solemnity.

faicht, moist, humid, damp.

faig, a fig.

faiv'gha, figs; also, though rarely, used in the sense of slapping or boxing one's ears.

faik, a fig.

faindt, enemy.

faindt'-lich, hostile; of evil disposition.

faindt'-shaft, enmity, hostility.

fai'-la, to file.

faisht'-'l-a, to "make fists," as in sparring.

fal, 1. a trap; a fall.

2. a circumstance, condition.

fal'-da, folds, creases, plaits.

fal'-der, bars in a fence that may be removed for passing.

fal'-där, a trap door.

fal'-en-krank'-et, epilepsy; *lit.*, falling sickness.

fa'-li-wal'-ter, pound apple. A variety of pale green apples varying in size and weight of from ten to eighteen ounces, sometimes even exceeding that.

fal'-la, to fall.

falsh, false, deceitful; resentful.

falsh'-hët, falsehood, anger.

fa-mil'-li-ya, family.

fa-mil'-ya, family.

fä'-na, flag.

fañg'-a, to catch, to contract.

fang'-tsë^a, tusks (cuspid).

far, for, before, because.

fär, for; used also as a prefix.

fä'-ra, to haul, or drive.

fär-ach'-ta, to despise, to hate or to avoid.

fa-rai'-sa, 1. to tear.

2. to go abroad, or far from home.

far'-ap, paint, color.

far-är'-yer-a, to aggravate.

far-är'-yer-lich, aggravating; vexatious.

fä-rä-wel', farewell, "good-bye."

farb, 1. color, shade.

2. paint—generic.

fär-bäd'-er-a, to confuse.

far-bai', part, gone by.

far-bai'-sa, to destroy by gnawing or chewing.

far-bi'-ta, to forbid.

far-bi'-gha, to bend out of normal form; to distort.

far-blen'-ar-ai', jugglery; to deceive by sleight of hand, or some other method.

far-blen'-na, to blind by reflection.

far-bläd', blossomed; past blooming season.

far-blü'-da, bloody; covered or besmeared with blood.

far-bod', commandment.

far-bö'-gha, bent out of shape.

far-brech'-a, 1. to break in pieces.

2. to violate; to disappoint by non-compliance with promise.

far-brech'-er, a criminal, law-breaker.

far-brek'-'la, to break into small pieces.

far-brendt', burnt. Used also to imply that the one spoken of has syphilis.

far'bren'-na, 1. to burn up.

2. to give syphilitic contagion.

far-bri'-a, 1. to scald.

2. to spoil eggs during hatching.

far-brid', 1. scalded; injured by scalding.

2. Eggs that will not hatch after due time are said to be *far-brid'*; *lit.*, over hatched.

far-brild', given to crying; synonymous with the common expression of "cry-baby."

far-brocht', squandered; spent in recklessness.

färch'-da, to fear, or to be afraid.

färch'-der-lich, fearful.

fär-dai'-henk-ert, a vulgarism implying *enormously*. Applied to persons who are incorrigible.

fär-dan'-ka, to have to thank for.

- fär'-dä'-ra*, to dry ; to spoil by drying too much.
- fär-darsht*, famished ; perished from want of water.
- far-där'-wa*, to spoil, to ruin.
- far-dau'-a*, to digest ; to assimilate.
- far-dau'-iñg*, digestion.
- far-dē'-la*, to divide, to apportion.
- fär'-dich*, done, finished.
- fär'-dich-a*, to bring to completion ; to finish.
- fär-dē'-na*, to earn.
- far-diñg'-a*, to serve, or to hire for service.
- far-dil'-ya*, to eradicate, to destroy by rooting out.
- fär-dinsht*, earnings, wages, merit.
- fär-dolt'*, confoundedly. Used as an adjective ; equivalent, in expressions, to "be darned."
- far-dop'-'lt*, doubled ; sometimes used to convey the idea of being confused.
- far-drai'-wa*, to dispel ; to drive away or to scatter.
- far-drē'-a*, to distort or to twist.
- far'-drē'-ta*, to tread upon ; to destroy by walking upon.
- far-drē'-sa*, to offend ; to vex.
- far-drīs'-lich*, vexatious.
- far-drus'*, bad feeling.
- far-dros'-sa*, entertaining bad feelings toward another, hurt in feelings.
- färd'*, a drive, or passage-way.
- fa-rel'*, trout (*Salmo fontalis*).
- far'em*, before this ; contraction of *far dem*.
- far-en'-er-a*, to alter or change.
- fa-rēⁿ'-nich-a*, to unite ; to compromise.
- fär-fal'-la*, to tumble to pieces, to go to ruin.
- fär-fau'-la*, to rot, to become rotten.
- fär-fē'-lä*, to miss.
- far-felsh'-ä*, to falsify, to counterfeit to adulterate.
- far-finsh'-der-a*, to obscure.
- fär-fī'-ra*, to seduce, to lead astray.
- fär-fī'-rer*, a seducer.
- far-fär'-ich*, deceptive, seductive.
- fär-fluch-a*, to curse.
- fär-fres'-sä*, 1. given to eat gluttonously.
2. to lose possessions through dissipations in eating.
- fär-frär'-ä*, to become frozen.
- fär-gaf'-fä*, to be captivated by looking.
- far-gañg'-a*, past, vanished, dissipated.
- far-gēⁿ'*, to dissolve, to dissipate.
- far-gel'-shter-a*, to scare, to intimidate, to cause anxiety.
- fär'-gēsh'l*, a driving whip.
- far'-gesh-ter*, day before yesterday.
- far-ges'-sa*, to forget ; forgotten.
- far-ge'-wa*, to forgive.
- far-gē'-wens*, in vain, unavailing.
- far-gē'-w'l-ich*, unavailing.
- far-gif'-ta*, to poison.
- far-glaich'-a*, to compare. Used also as an expression to denote a circumstance.
- far-glaich'-lich*, comparable ; that which bears comparison.
- far-gnīcht'*, content, satisfied.
- far-gnī'-gha*, to content one's self, to be satisfied.
- far-gnī'-ghlich*, contentedly.
- far-gnī'-ghlich-kait*, contentment.
- far-grà'-wa*, to bury.
- far-grē'-sar-a*, to enlarge, to magnify.
- far-grē'-ser-iñgs gläs'*, magnifying glass.
- far-guk'-ka*, to overlook.
- far-gukt*, overlooked ; to err through looking too intently.
- far-gun'-na*, to envy.

far-hailt', given to crying. Rather a better and more polite expression than *fär-brilt'*.

far-hak'-ka, to chop up into small pieces.

far-härd'-ta, to harden.

far-has'-sa, to despise, to hate.

far-hē'-la, to secrete.

far-helt-nis, relation, compact.

far-henk'-ärt, an expression synonymous with devilish, darned, etc.

far-hin'-ar-a, to hinder, or to cause delay by annoyance.

far-hī'-ta, to prevent; to avoid.

far-hud'-l-a, to tangle; to confuse.

far-hūng'-er-a, to starve.

far-hun'-sa, to despoil, to botch.

far'-icht, 1. fear.

2. furrow—made by a plow.

fär'-ich-da, to fear; to be afraid.

fär'-ich-ta, to fear; to be afraid.

far-kâ'-fa, to sell.

fär-kaf'-ta, to notch, by cutting.

fär-kär'-tā, to shorten.

fär-kär'-tse-ra, to shorten.

fär-kef'-l-a, to notch, to cut notches upon an object.

far-kel'-ta, to take, or catch, cold.

far-kert, deranged, "mixed up."

far-kesk'-dich-a, to furnish food.

far-kin'-dich-a, to make known, or to announce.

far-klä'-gha, to inform upon; to complain; to excuse.

far-klen'-a-ra, to make smaller.

far-knech'-a-ra, to ossify.

far-knip'-pa, to knot, to secure by tying knots.

far-knod'-lt, knotted.

far-ko-lä-bī'-ra, to confuse, to mix.

far-kwed'-sha, to bruise by squeezing.

far-lä'-fa, to stray; to come to pass or to transpire.

far-laicht', perhaps.

far-lañg'-a, to desire, to long for.

far-lē'-gha, to misplace, to mislay.

far-lē'-ghen-hait, opportunity.

far-lē'-na, to let, to rent.

far-lēng'-ar-a, to lengthen.

fär'-lē-sich, negligent.

fär'-lē-sich-kēd', negligence.

far-lē'-ta, to become discontented.

far-let'-sa, to wrong, to injure or spoil; to maim.

fär'-līng, farthing.

far-tī'-ra, to lose.

far-los'-sa, to leave, to desert.

far-lushdt, loss.

far-lush'-der-a, to enjoy one's self.

far-mach'-a, to bequeath.

far-mät'-la, to grind into powder.

far-med'-tsla, to cut fine, to massage.

far-mē'-ra, to increase; to prosper by accretion.

far-mik'-sa, to confuse by mixing.

far-mis'-sa, to miss.

far-mūd'-lich, probably.

fär'-na, in front; before.

fär'-na-drān', ahead, in advance.

fär'-na-drin, in the front part.

fär'-na-druf, on the fore part; a superior position.

fär'-na-här, in advance of.

fär'-na-hīn, to the front.

fär'-na-naus, in advance of.

fär'-nä-naus-b'tsält, prepaid; paid in advance of.

far-nem'-ma, to comprehend or understand; also used in some localities in the sense of feeling aggrieved at what one is saying or doing.

far-nich'-ta, to disown, to destroy.

far'-nis, furnace; a heater.

far-numft', despised, ostracised.

far-nunft', despised.

far-push'-a, to spoil, to make a misfit.

far-rai'-sa, to tear.

fār'-ra-wa, to dye or to color.

fār'-ra-wer, a dyer.

far-rek'-ka, to die, as cattle, to become like carrion.

far-rik'-ka, to displace, to be able to budge.

far-rikt, demented, of unsound mind.

far-rō'-da, to betray.

far-rop'-pa, to pull to pieces; to pluck.

far-run'-s'la, to wrinkle.

fars, for it, before the; contraction of *far des*.

far-sat'ⁿⁱ-ma, to waste time, to neglect, to miss, or to be too late.

far-sau'-a, to soil, to dirty.

far-sau'-fa, to drown.

far-sē'-a, to foresee, to provide.

far-sē'-fa, to drown; to drown one's self.

far-sē'-gha, to spoil by sawing; to saw into pieces.

far-sē'ⁿⁱ-na, 1. to oversee, to administer, to provide beforehand.

2. to mistake, to err.

far-sēñg'-a, to singe or scorch.

far-senk'-ka, to singe, to scorch.

far-set'-sa, to dislocate; to change by misplacing.

far-shaf'-fa, to work up, to consume material in work.

far-shbâr'-ra, to save for future use, to reserve for emergency.

far-shin'-na, to skin, to abrade the cuticle.

far-shî'-sa, to shoot away, or consume by shooting away all.

far-shit'-ta, to spill.

far-shla'-gha, 1. to knock to pieces.

2. one given to kicking.

far-shlap'-pa, to spill; to make a mess of an undertaking.

far-shlô'-fa, to drag away, or to scatter by carrying away.

far-shlô'-fa, to oversleep.

far-shlup'-pa, to secrete, to hide.

far-shmai'-sa, to destroy by throwing.

far-shmak'-ka, to taste.

far-shmel'-sa, to melt, or dissolve.

far-shmâr'-ra, to besmear, to soil.

far-shmo'-ka, to darken by smoking.

far-shnai'-da, to cut up, to cut to pieces.

far-shprê'-a, to spread out, to scatter.

far-shprech'-a, 1. to promise, to betroth.

2. an agreement or promise.

far-shpreñg'-a, to cause to burst.

far-shpriñg'-a, to cause to burst.

far-shproch'-a, promised, betrothed.

far-shrai'-wa, to convey by writing.

fâr'sht, a verse, or stanza.

fârsh'-ta, heel.

fâr-shtând', understanding, sense.

far-shtê'ⁿⁱ, to understand, to comprehend.

fâr-shtê'ⁿⁱner-a, to petrify.

far-shtech'-a, to pierce, by repeatedly thrusting the instrument.

far-shtek'-'l a, to hide, to secrete.

far-shtel'-la, to change, to simulate, or to conduct one's self.

far-shten'-nich, intelligent, intelligible.

far-shtend'-nis, understanding, sense.

far-shtêr'-ra, to disturb.

far-shtik'-ka, to suffocate.

far-shtim'-'l-a, to spoil.

far-shtô'-la, one given to pilfering; clandestinely.

far-shtop'-pa, 1. to plug or stop a leak.

2. constipated, clogged.

far-shtop-piñg, constipation.

far-shtopt, constipated, clogged.

far-shtô'-sa, to disown, to reject.

far-shtru'-w'l-a, to dishevel.

- far-shwai'-gha*, to keep to one's self, to be retiring.
- far-shwel'-la*, to swell to excess.
- far-shwēr'-ra*, to vow.
- far-shwin'-na*, to disappear.
- far-sich'-er-a*, to secure, to insure, or to give indemnity.
- far-sich'-er-iñg*, } security, insu-
far-sich'-er-uñg, } rance.
- far-sin'-dich-a*, to burden one's self by sinning.
- far-sink'-ka*, to sink out of sight.
- far-sof'-ner*, a drunkard, a sot.
- far-such'-a*, to taste; to tempt.
- fart*, off, away.
- fart'-dau-ra*, to continue, to last.
- fär't'l*, a fourth; a quarter of a dollar.
- far-tse'-la*, to relate, to narrate.
- far-trau'-a*, to confide, to trust.
- far-tsai'-u*, to forgive.
- fär'-tse*, fourteen.
- far-tsâ'-gha*, to despair.
- far-tsär'-na*, to anger, or cause to be vexed or angry.
- far-tse'-gha*, to wait, to tarry.
- far-tse'-la*, to relate, to narrate.
- far-tse'-luñg*, a narration, a tale.
- far-ür'-sach-a*, to cause.
- far-wai'-la*, to amuse one's self, to linger.
- far-wâ'-ra*, to guard or protect; to cherish with care.
- far-war'-ka*, to forfeit.
- far-wärt'*, delirious, confused.
- far-wär'-ya*, to strangle or to choke.
- far-was'*, why, wherefore.
- far-weks'-la*, to change, or mistake for one another; to confuse.
- far-wel'-ka*, to wither, or shrivel.
- far-wēn'-na*, to cause children to become spoiled by indulgence; to spoil.
- far-wē'-ra*, to prevent or to hinder, to prohibit; to protect.
- far-wē'-sa*, to moulder, or become spoiled.
- far-wēs'-lich*, that which is liable to moulder, or spoil.
- far'-wich*, colored, varied in color.
- far-wik'-la*, to tangle, to confuse.
- far-wun'-da*, to wound, to maim.
- far-wun'-ner-a*, to be astonished, or to wonder.
- far-yâ'-gha*, to chase away, or to scatter, as game.
- fas*, cask, barrel.
- fas'-sa*, 1. to measure—into bags.
 2. to hive bees; to put bees into hives.
- fâ'-sa-nacht*, Shrove Tuesday.
- fasht*, fast, secure.
- fasht'-a-tsait*, Lent; *lit.*, time of fasting.
- fäs'-nacht*, Shrove Tuesday.
- fäs'-nacht-kuch-a*, doughnuts. Cakes eaten on Shrove Tuesday.
- fa'-ter*, father.
- faul*, lazy; decayed, rotten.
- fau'-la*, 1. to rot, to decay.
 2. to idle, to loaf.
- faul'-halts'*, diptheria; sore throat.
- fiul'-häd*, laziness, idleness; decay.
- fau'-len-tsar*, sluggard, idler, loafer.
- fausht*, fist.
- fech'-la*, to fight.
- fed*, fat, grease.
- fed'-ar-bēⁿ*, fore leg.
- fed'-ar-fis*, fore feet.
- fed'-ar-kshär*, harness of leader of a team.
- fed'-arsht*, first, foremost.
- fed'-ar-shunk'-ka*, shoulder—of bacon; *lit.*, fore ham.
- fed'-er*, feather, quill.
- fed'-lich*, fatty, greasy.
- fed'-t'r-dek*, feather bed.
- fed'-t'r-fas-iñg*, bed-tick.
- fed'-t'r-fä'*, poultry.
- fed'-t'r-kai'-l'l*, quill; quill fit for making a pen.

- fed'-l'r-mes'-er*, pen-knife.
fed'-tsa, shreds, fibres.
fe'-gh'l-misht, guano.
fē'-ich, capable, suitable.
fēl, skin, pelt.
fēl, for sale; that which may be purchased.
fē'-la, to fail or disappoint.
fēld'-mes-ser, surveyor.
fēldt'-bred-ich-ar, chaplain; *lit.*, field preacher.
fē'-ler, fault, error.
fēl'-grif, to miss, an error.
fēl'-lich, fully, ample.
fēl'-sa, rock, rocks.
fēl'-sich, rocky.
fēl'-ya, felloe—of a wheel.
fēl'-yor, a year of scarcity.
fēn'-du, vendue, public sale.
fēn'-du-kräi'-yer, crier or auctioneer at a sale.
fēn'-ich'-l, fennel seed, fennel plant.
fēns, fence.
fēn'-sa-maus, chipmunk; *lit.*, fence-mouse.
fēnsh'-der, window.
fēnsh'-ter, window.
fēnsh'-ter-rām, window sash.
fēnsh'-ter-rā'-ma, window sash.
fēnsh'-ter-sits, window sill.
fēnsh'-ter-shaib, window pane.
fēr, *fār*, *f'r*, for; used as a prefix.
fēsht, 1. secure, tight, fast.
 2. a festival, jubilee.
fēs'l, a small cask or keg; diminutive of *fas*.
fēt, fat, grease.
fēl'-ar-bē'-nich, feather legged.
fēl'-er, feather, quill.
fēl'-kich'-l-chiar, doughnuts; *lit.*, fat cakes, *i. e.*, cakes baked in melted lard.
fī, cattle.
fī'-d'l-bō'-gha, violin bow.
fī'-d'r-a, to feed, to nourish.
fiks, a fix, a quandary.
fik'-sa, to fix, to arrange.
fīl, much, many.
fīl, colt.
fī'-la, 1. to feel.
 2. sometimes used for *fīl*—many.
fīl'-la, 1. to fill.
 2. sometimes used when speaking of a mare giving birth to a colt.
fīl'-ar-a, various, numerous ones.
fīls'-ich, filthy, dirty.
fīl'-s'l, dressing taken from roast fowl, or breast of veal.
fīls'-laus, crab-louse, body louse.
fīnf, *fīn'-fa*, five.
fīnf'-bich-er Mo'-se, Pentateuch; *lit.*, five books of Moses.
fīnf'-fing'-er-kraut, cinquefoil.
fīnst, fiftth.
fīng'ār, finger.
fīng'ār-a, to finger; to handle, or to meddle with.
fīng'ār-hūt, thimble; *lit.*, finger-hat.
fīng'ār-līng, finger stall.
fīng'ār-rīng, finger ring.
fīng'ār'-l-a, to sparkle, to glimmer.
fīn-ī'-ra, to veneer.
fīn'-na, to find or discover.
fīn'-ner, finder.
fīnsh'-der, 1. window.
 2. eclipse, opaque.
fīnsh'-der-nis, eclipse.
fīp, a small silver coin of the value of 6¼ cents, known as *fīb'en-i-bit*.
fīr, four.
fī'-ra, 1. four.
 2. to lead.
fīr'-ek-ich, four cornered, square.
fīr'feld-ich, fourfold.
fīrt, fourth.
fīsh, fish.
fīsh'-a-rai', fishery.
fīsh'-brūd, spawn.
fīsh'-gār'n, fish net.

fish'-ham'-mer, a net used for fishing; constructed by having an upright handle attached to a hoop, or half hoop fastened to a straight bottom piece, to hold open the bag-shaped net. This is held near deep holes or rocks while an assistant with a long pole starts up the fish.

fish'-ō-ra, gills; *lit.*, fish ears.

fish'-râi'-yer, kingfisher, applied also to cranes, herons, etc.

fish'-shpēⁿ, whalebone; *lit.*, fish chips, or shavings.

flach, flat.

flaicht, perhaps; contraction of *far-laicht'*.

flais, industry, thrift.

flai'-sich, industrious.

flak'-er-ich, flickering, varying.

flak'-ka-ra, to flicker, to flare.

flaks, flax.

flam, flame.

fla-nel', flannel.

flang-gā'-ra, to flounder, to rove.

flash, flask.

flē, flea.

flech'-ta, to plait.

fled'-ter-wish, feather duster.

fled'-t'r-maus, butterfly.

fle'gh'l, a flail, used in threshing.

fle'-gh'l a, to thresh with a flail.

fle'-gh'l-haft, scurrilous, impertinent.

flē'-graut, smart-weed.

flek, a speck, or spot.

flek'-ich, spotted.

fleks, tendon, sinew.

flēsh, flesh, meat.

flī'-gha, to fly.

flī'-gh'l, wing, wings; a vane.

flik, full fledged.

flik'-ka, to mend, to patch.

flindt, a gun.

flind'-ta-kol-wa, gun-stock.

flind'-ta-lâf, gun barrel.

flind'-ta sheft, gun stock.

flink, quick, active.

flis'-sich, eruptive, or liable to cutaneous eruptions.

flitsh'-a, to slip off.

flitsh'-er, a quick slap, or crack of a whip.

flō, flea.

flok, flake, also used in some portions to designate a flock (of birds).

fłor, floor.

fluch, a curse.

fluch'-a, to swear, to use profane words.

flucht, flight.

flus, rheumatism.

flus'-fed'-ter-a, flns.

flus'-ka-rel'-la, amber beads, employed by hanging to children's necks to remove eruptive affections, etc.

flus'-sich, scrofulous, eruptive; liable to affections resulting from impoverished blood or hereditary affections of the skin.

fod'-r-a, to ask for, to demand.

fo'-gh'l, bird.

fol, full.

folk, people, nation.

folk'-sâgha, folk-lore; *lit.*, folk saying.

fol'-kun'-ma, mature, perfect.

fol'-licht, full moon; *lit.*, full light.

fol'-mânt, full moon.

fol'-shen-dich, complete.

fol'-ya, 1. to obey, or to comply with.

2. consequences, results.

fōr, before, in front.

fōr'-dref-lich, excellent.

fōr'-el'-ta-ra, ancestors; *lit.*, fore parents.

fōr'-fel'-ar, ancestors; *lit.*, fore fathers.

fōr'-geñg-ar, ancestors.

för'-här, previously, hitherto.

för'-hald'-ta, to upbraid, to reiterate.

for'-icht, fear, dread.

för'-lê'-sa, to read in advance. The pastor formerly read each line of a verse or stanza, when the congregation sang it, proceeding thus through the whole hymn. Originated on account of scarcity of books in those times.

för'-lê'-sich-kait', negligence.

för'-nâ'-ma, given name; *pro nomen*.

för'-nem'-ma, to undertake, to venture, to purpose.

för'-nem mes, an undertaking, a venture.

för'-nemsht, the best, superior.

för'-sê'-na, to foresee, to anticipate or to provide beforehand.

för'-shmai'-sa, to accuse.

för'-shtë'-ar, deacon—in a church.

för'-sicht'-lich, cautious, circumspect.

för'-shtel'-lîng, foreboding.

för'-shus, overshoot.

för'-tsî'-gha, to prefer, to choose in preference to another.

för'-tsugh, preference, choice.

för'-tsuk, preference, choice.

för'-wit'-sich, forward, indiscreet.

f'r, contraction of *fer*, *far*, and *fär*, for.

frâ, wife, woman.

frai', free.

frai'-a-rai', courtship.

frai'-ge-wa, to set free; to give liberty or freedom.

frai'-ge-wich, liberal, charitable.

frai'-hed, liberty, freedom.

frai'-los'-sa, to liberate; *lüt.*, to let off.

fraind, friend.

fraind'-lich, friendly.

fraind'-shaft, 1. friendship, acquaintance.

2. relationship, kinship.

fraindt, friend.

frain'-shaft, 1. friendship.

2. relationship, kinship.

frai'-wil'-ich, voluntarily.

frak-tû'-ra, 1. Gothic figures, or type.

2. to write in old German or Gothic characters.

fram, pious, sanctified.

fran'-s'l, fringe; tatter.

fran'-s'-la, 1. to fringe, to tear in tatters.

2. *pl.* of *fran'-s'l*.

frans'-lich, fringed.

fran-sôs', syphilis-venereal disease; *lüt.*, Frenchman.

frats'-ich, foppish and impertinent.

frê'-a, to rejoice, to be glad.

frêch, impertinent, saucy.

frê'-lich, 1. happy, joyful.

2. certainly, assuredly.

frê'-lîng, spring.

frem, strange.

fres'-sa, to eat gluttonously; to devour or bolt food.

frî, early.

frî'-ab-'l, early apple; *i. e.*, harvest apple.

frî'-da, peace.

frî'-dens-richt'-dar, justice of the peace.

frîd'-lich, peaceable, amicable.

frî'-ra, to freeze, to be cold.

frish, fresh.

fris'-s'l, a fine rash, such as first appears in scarlatina, measles, etc.

frî'-yor, spring.

frô, glad, pleased.

frôg, a question, an inquiry.

frô'-gha, to ask, to inquire.

frôk, a query, question.

frosch, frog; tree frog.

- frots'-hans*, a conceited braggart, a fop.
- frots'-ich*, pompous, foppish, imperinent.
- frucht*, grain, cereals.
- frucht'-bär*, fruitful.
- frucht'-kam-mer*, granary.
- frucht'-krân*, beard, of ear of grain.
- frucht'-plan-sa*, cereals.
- fû'der*, feed, fodder.
- fuf'-tse*, fifteen.
- fuf'-tsët*, fifteen.
- fuf'-tsich*, fifty.
- fuks*, fox; sorrel color (as of horse).
- fuks'-gaul*, sorrel horse.
- fum*, from, from the; contraction of *fun dem*.
- fum'-b'la*, to fumble, to feel for a thing in an awkward manner.
- fun*, of, from.
- funk'-ka*, spark.
- funk'-'l-a*, to sparkle, to scintillate.
- fun'-'m*, from him, from it; from *fun im*, and *fun em*.
- fun'-nä-rä*, from her; contraction of *fun ira*.
- für*, a team.
- für'-gê-shel*, horse whip, used by teamsters.
- für'-man*, teamster.
- fūs*, foot.
- fus'-sar*, fuzz, delicate fibres as of lint or cotton.
- fus'-sar-a*, to fuzz, or become fuzzy.
- fus'-ar-ieh*, fuzzy.
- fūs'-geñg-er*, pedestrian.
- g, g', gä, ga, ge*, employed as a prefix to denote past tense.
- gâb*, gift, donation.
- gä-bai'*, building.
- gä-belk'*, beams.
- gä-bêd'*, prayer; toasted.
- gä-bêl'*, prayer.
- ga bik't*, stooped, bowed.
- ga-bis'*, bit, teeth—as a set.
- ga-blü'*, blood, circulation of blood; bloom.
- ga-bod'*, bid, offer.
- ga-bô'-ra*, born.
- ga-bort'*, birth.
- ga-borts' dâk*, birth-day.
- ga braich'-lich*, customary.
- ga-brauch'*, custom, habit.
- ga-brauch'-lich*, customary.
- ga-broch'-a*, broken; ruptured—hernia.
- ga-brocht'*, brought.
- ga-bro'-fa-tsait'*, predicted, foretold.
- ga-bund*, bundle—as of straw.
- ga-bun'-na*, bound, tied; also used to signify apprenticed.
- ga-dank'-ka*, thoughts, impressions.
- ga-därt'*, dried.
- gä-decht'-nis*, memory, mind.
- gä-dicht'*, poem.
- gä-dir'*, an animal.
- gä drai'*, true, faithful.
- gä-drenk'*, beverage, drink of any kind.
- gä-dshumpt*, jumped.
- gä-dū^o'*, done; past tense of *tse dū^a*—to do.
- gä-duldt*, patience.
- ga-duld'-tich*, patient; docile.
- gaf'-fa*, to stare, to look idly, to gape at.
- gä-grish*, loud noise of voices, yelling; great ado in talking.
- ga-hör'-sam*, obedient.
- gai'-ar*, turkey buzzard.
- gai'-gher*, a fiddler.
- gaiik*, violin.
- gail*, horses; pl. of *gaul*.
- gails'-dok-ter*, farrier.
- gails'-kesh*, horse chestnut.
- gaisht*, ghost, spirit, apparition.
- gaits*, avarice.
- gaits'-hals*, miser.
- gaits'-ich*, miserly, stingy.
- gak'-'l*, egg.

gā-krai'-der, 1. herbs and plants used in domestic cooking and medicine.

2. mystical manœuvres, *hocus pocus*.

gā-krai'-der-sup, vegetable soup.

gak'-sa, to cackle—like a hen.

gal', 1. bile.

2. gallon.

gal'-ar-ich, soused pig's feet.

gā-lärndt', learned, educated.

gā-lē'-gha-hēdt, opportunity, occasion, chance.

ga lē'-gh'n-hēt, opportunity, chance.

gā lind, mild, smooth, gentle.

gā liñg, lungs, liver and heart of slaughtered animal.

gā-lēr'-sam-kēd, learning, erudition.

gā-tīht', loved, beloved.

gal-lün', gallon.

gal'-rī-wa, ruta бага—variety of turnip.

gal'-ya, gallows.

gam'-ber, camphor.

gā-mēⁿⁱ', congregation.

gā-mēⁿⁱ-sheft-lich, in common, pertaining to the union of the whole number of persons.

gā-mīs', vegetables; usually applied as served on the table.

gā-mist', had to, obliged, compelled.

gam'-la, to gamble, to play for stakes.

gā-mech', a construction, make-up; applied also to the genital organs.

gā-mâⁿⁱ-na, to remind.

gā-nau', exact, precise.

gañg, hall or entrance, passage way.

gañg'-a, gone, went; passed.

gans, 1. goose.

2. entirely, entire, whole.

gan'-sard, gander.

ga-nunk', enough, sufficient.

gâr, 1. quite.

2. sufficiently cooked, or completed.

gâr'-ä-wa, 1. to tan.

2. to thrash.

gâr'-ä-wer, tanner.

gâr'-da, garden.

gâr-dän', guardian.

gâr'-d'l-är, gardener (rare).

gâr'-d'n-är, gardener.

gar-dūⁿⁱ', calico.

gä-recht', just, justice; equitable.

gä-rech'-tich-kēd, justice; satisfaction.

gar'-i-gh'l, windpipe, trachea, *pomum adami*.

gar'-i-ghla, to gargle.

gä-riñg', slight, trifling; sometimes used to signify exact, careful.

ga-riñgsh't, slightest, least.

ga-risht, prepared; scaffolding.

ga-risht'-hols, a put-log.

gâr'-ken-ni, none, none at all.

gâr'-kens, none at all.

gârn, 1. yarn.

2. a net.

gârn, willingly, gladly.

gâr'-net, not at all.

gârsh'-ta, barley.

gâr'-l'l-a, to garden, or cultivate a garden.

gâr'-tshel, cordial.

gä-ruch', smell, odor.

gâr'-wer, tanner.

gâr'-wer-ai', tannery.

gâr'-wer-grüb, tanner's vat, for soaking hides in tan, or lime.

gaul, horse.

gaund, dress, frock.

gaunsh, a swing.

gaun'-sha, to swing.

gû'-wa, alms.

ga'-wel, fork, bifurcation.

ga'-wel-tsink'-ka, prong of a fork.

ga-we'-na, to accustom, or habituate.

ga-wis'-sa, 1. conscience.

2. certain, specified.

3. shown; past tense of *tse wais'-sa*.

ga-wēr', firearm, gun.

ga-yam'-mar, moaning, lamentation.

ge, go, to go.

gē^a, to go.

gē'-a, go, to go; this form is of seldom occurrence.

ge-blatshd', sounded in imitation of splashing, or slapping.

ge-blēcht', bleached, whitened.

ge-drai', obedient, faithful.

ge-denk'ka, to remember, to recall.

ge-dim'-m'l'd, thundered.

ge-dish'-d'l-ird', distilled.

ge'-ghend, region, locality, neighborhood.

gēl, yellow.

gel, is it not so?

geld, 1. money.

2. is it not?

geld'-sak, purse; *lit.*, money bag.

ge-lēg', layer, or layers.

gel'-la, is it not so?

gēl'-rōp, carrot; *lit.*, yellow turnip.

gēl'-shpēcht, flicker or yellow hammer (—*Colaptes auratus*).

gēl'-sucht, jaundice.

gēl'-weshp, yellow jacket (insect).

gens'-blum, daisy.

gē'-ra, to ferment.

ge-run'-na, 1. curdled, coagulated.

2. leaked.

gēs, goat, goats.

gesh'-der, yesterday.

gēsh'-el, a whip.

ge-tso'-gha, removed; pulled.

ge'-wa, to give, to donate.

ge-wid'-der, lightning.

ge-wid'-d'r-rüt, lightning rod.

gfal'-la, 1. fell.

2. to be pleased with.

gfecht, fight, fighting, battle.

gfel'-ich-kait, satisfaction, favor.

gfel'-ich-kēd, satisfaction, favor.

gfelkdt, fallowed.

gfēr'-lich, dangerous.

gfīl, feeling, sympathy.

gfloch'-ta, plaited.

gfōr, danger, peril, risk.

gfrō'-ra, 1. frozen.

2. to have been cold.

gfūld, fooled, imposed upon.

gfun'-na, found, discovered.

g'gos'-sa, 1. cast—in a mould.

2. poured, from a sprinkler.

g'hēs, command, order; a saying.

gich'-ter-ra, convulsions.

gicht'-rōs, peony.

gift, poison.

gift'-shwam, toadstool—*agaric*.

gik'-sa, 1. to stick or stab, to nudge into one's ribs.

2. to snicker, to giggle.

gīl'-ler-ī, killder plover.

gin'-ni-hink-'l, guinea fowl.

gip'-p'l, spire, apex, on the summit.

gips, gypsum, plaster of Paris.

gī'-sa, 1. to sprinkle with a sprinkling pot.

2. to cast, in moulds.

gīs'-kan, watering pot.

gi'-w'l, gable.

ge'-w'kēnd, gable end.

gi'-w'l-ēnd, gable end.

glab'-bōrt, clapboard, palling.

glaf, key of piano or organ.

glaf'-fīr, piano forte.

glā'-gha, to complain, to enter complaint.

glai, soon.

glai'-a, bran.

glai'ch, equal.

glai'ch'-a, to like, to admire.

glai'ch'-ge-wicht, balance, scales; *lit.*, equal weight.

glāk, complaint.

glai'ch'-nis, parable; comparison, equal.

glans, lustre, reflection.

glâ'-wa, to believe, belief.

glàs, glass.

glat, smooth.

glēⁿ, small, little.

glē'-ā, clover.

glē'-da, to clothe.

glēdt, article of clothing, garment.

glem'-ma, to pinch, to jamb.

glēⁿ-ni-shluñg'-a war'-ts'l, "small snake-root," Virginia snake-root (*Serpentaria virginiana*).

glensht, smallest.

glen'-sa, to shine.

glēs, rut, wheel track.

glē-sūr', glazing, gloss.

glēt'-ta, burdock.

glē'-dich, red hot.

glādt, a member—part of body ; member of an association.

glīk'-ers, marbles ; testicles.

glīsh-ich, slippery, icy.

glīt'-s'r-a, to glitter.

glīt'-s'r-ich, glittering, shiny.

glō'-a, claws ; a staple.

glō' a-fet, neats'-foot oil.

glō' a-fūs, cloven foot.

glōf'-der, a cord—of wood.

glōk, bell.

glōk'-ka-blum, columbine.

gluk, a hen.

gluk'-ka, to cluck—like a hen.

glump'-a, a lump, a heap.

g'mād, 1. swath.

2. measure or part, equal to a portion, as one being able to contend with or doing as well as the others.

gnād, grace.

gnā'-da, grace, piety.

gnar'-ra, 1. to growl.

2. projection on the trunk of a tree, a spur or burr.

gnar'-ish, apt or prone to growl.

gnārsh'-a, to gnash—as the teeth.

gnar'-shich, gnarled, or knotty.

gnech'-'l, small bone ; digital joints.

gnēd'-lich, gracious.

gnetsh'-ich, cartilaginous ; "gristle."

gnīk, vertebral joint of the neck ; applied to the back of the neck.

gnoch'-a, bone, bones.

gnoch'-a-yār'-i-gh'l, skeleton.

gnoch'-ich, bony ; lean.

gnop, 1. button.

2. a knot.

gnop'-holts, buttonwood tree, sycamore.

gnop'-loch, button hole.

g'num'-ma, taken, required.

gōdt, godmother.

gold, gold.

gold'-am'-shel, Baltimore oriole ; *lit.*, gold robin.

gol'-den-dūr, golden tincture.

golt, gold.

Got, God.

go-w'r-nār', governor.

grâb, grave.

grād, straight, exact, right, now ; *grād a-wek'*, right away, immediately.

grām'-bī-ra, cranberries.

grân, 1. crown.

2. barb, of the ear of grain.

3. fishbone, of thin sharp form—as the ribs.

grâⁿ-na, stop-cock ; spigot.

gra'-w'-l-a, to crawl ; to grovel.

grē'-âk, corn—on the foot.

grīsh-dār', a syringe.

grīsh-dār'-iñg, an injection.

grīsh-dār'-ra, to give an enema with a syringe.

grōb, coarse, rude.

g'roch'-a, smelled, scented.

grot, toad (—*bufo*).

grot'-ta-bal-sem, pennyroyal ; *lit.*, toad balsam.

- grüb*, a hole or pit.
grub'-hak, a pick-axe.
grub'-pa, to grub, or dig with a pick, or hoe.
grum', crooked.
grum'-bär, potato.
grum'-bär, potato.
grum'-buk-lich, hunch-backed ; round-shouldered.
grum'-la, to grumble, to growl.
grum'-lich, given to grumbling, or to growling.
grund'-nis, peanut.
grund'-sau, ground hog.
grusht, crust.
grus'-'l.bär, gooseberry.
grus'-lich, gristly.
gsa'ng, a song ; singing.
gsät, told, said.
gsel'-shaft, association, society.
gshär, 1. harness.
 2. implements or tools.
 3. crockery, dishes.
gshbas, sport, fun, amusement.
gshait, intelligent, smart.
gshē'-da, divorced.
gsheft, work, occupation, business.
gshenk, gift, present.
gshicht, tale, narrative, story.
gshikt, 1. expert, clever.
 2. sent—past tense of *tse' shik'-ka*, to send.
gshlecht, family or branch of family, clan, gens ; generation.
gshmak, taste.
gshprēch, conversation.
gshprōch, language, speech ; an axiom, saying.
gsh tall, a frame ; a wooden structure.
gsh te'-a, to acknowledge, to own up to.
gsholt'-a, scolded ; a thing to be avoided on account of its being badly spoken of.
- gsh topt'-a-fol'*, filled to the utmost ; stuffed to the limit of capacity.
gshwä'-ra, a boil ; boils.
gshwind, quick, fast, hurry.
gshwindt, quick, in haste, hurry.
gshwish'-da-ra, children of the same mother, brothers and sisters.
gshwish'-der-kin'-ner, cousins.
gsicht, face.
gs of'-fa, drunk, intoxicated.
gsundt, well, healthy.
gsund'-hēt, health.
g'tsif'-fer, 1. markings made with a pen or pencil ; calculations.
 2. insects ; small animal life in general.
g'-tso'-gha, moved, pulled.
g'-tswü'-ichd, twilled.
guk, look, a look, a view.
guk'-gum'-mer, a cucumber.
guk'-ka, to look, to see, to behold.
guk'-uk, a cuckoo.
gum'-a, 1. gum tree.
 2. to gum, to paste with mucilage.
 3. the gums.
gum'-mer, a cucumber.
gus, a casting.
güt, good.
güt'-rich-ich, fragrant.
g'-walt, strength, power.
g'-wall'-ich, powerful.
g'wärb', joint.
g'-wärts, spices ; garden plants used in cooking.
g'-weks', tumor, growth.
g'-welb', arch ; roof of a vault.
g'-wēn'-lich, usually, ordinarily.
g'-wicht', weight.
g'-win', 1. gain.
 2. thread of a screw.
g'-wis', certainly, assuredly.
g'-wis'-sa, 1. conscience.
 2. shown ; past tense of *tse wai'-sa*, to show.

g'-wit'-'r, thunder, thunder-storm,
lightning.

g'-wit'-'r-rüt, lightning rod.

g'wolt, wanted, desired, wished.

g'wun'-ner'd, wondered.

häär, here, hither.

häär-ra, to hear.

häärdt, a herd, flock, drove.

håbt, chief, principal.

håbt'-sum', principal at interest.

haf'fa, an earthen pot, or jar.

haft, 1. rivet, clasp.

2. eye, for hooking on dresses
—hook and eye.

håi, hay.

haich'-la, to simulate.

haich'-lar, hypocrite.

haich'-lar-ai, hypocrisy.

hai'-da, heathen.

håi'-et, haying season.

haif'-ich, numerous, in quantity,
plentiful.

haif'-la, to heap up, to gather into
a heap.

haifls, heaves.

hai'-la, to cry, to weep.

hai'-land, Saviour.

hai'-lich, holy, sacred.

håil'-mit'l, remedy.

hai'-ar-åt, wedding.

hai'-ar-a, to marry.

hair'-ra, to marry.

hai'r'-ich, desirous of marriage.

håi'-ref, hay rick.

håi'-shrek er, grasshopper.

håis'-lich, domestic.

håit, to-day.

håit'-se dågs, at the present time;
now-a-days.

hak, hoe.

hak'-ka, 1. to chop, or to cut.

2. to whip.

hak'-'l, a hackle.

hak'-'l-a, to hackle (as flax).

hak'-mes-ser, cleaver; *lit.*, chop
knife.

halb, half.

halb'-lai-na, half linen — linsey-
woolsey.

halb'-nacht, midnight; *lit.*, half
night.

halb'-shiti'-w'l, "half boots," gait-
ers.

halb'-shtrëñg, chains forming the
end of traces.

halb'-yër'-ish, half - yearly; six
months old.

hal'-da, to hold, to retain.

hådt, halt, stop.

hak'-tar, halter.

hak'-tar-ri'-ma, halter strap.

hålm, a stalk of grass or grain, a
blade.

håls, neck, throat.

håls'-aus-tsë-ruñg, laryngitis; ap-
plied also to bronchitis.

håls'-band, collar, neck band.

håls'-dùch, muffler, neckerchief.

håls'-gnik, neck joint.

håls'-grå-gha, cravat.

håls'-wë, sore-throat.

hal'-ta, to hold, to retain, to secure.

hal'-unk, a rascal.

hal'-wer, half.

hal'-w'r-gaul, dock; *lit.*, half-horse.

ham'-el, a calf; a lubberly fellow.

ham'-mar, hammer.

ham'-mar-shlak, scales of iron, re-
sulting from forging or ham-
mering; dross.

hå'-na, rooster.

hand, hand.

hand'-dùch, towel; *lit.*, hand cloth.

han'd'l, trade, commerce, exchange.

hand'-låñg-er, assistant; tender,
hod-carrier.

hand'-ri-gh'l, hand rail, bannisters.

hand'-wår-ik, trade, occupation.

hand'-wår-iks-g'shår, tools, imple-
ments.

- hand'-wär-iks-lait*, laborers, working-people.
hand'-wär-iks-man, mechanic.
hand'-wärik, trade, occupation.
hanft, hemp.
hang, 1. a bracket for dishes or food.
 2. slope, declivity.
hans, "Jack," foolish fellow.
hans'-warsh, a clown.
här, Lord, Mr.
hä'-ra, to hear; to obey.
hä'-ra-fo'-gh'l, jay-bird.
hä'-rä-sä-għa, hearsay.
härbsht, autumn; fall of the year.
hard, hard.
här'-da, to harden.
härd'-gräs, herd grass; pasture.
har'-äich, hurry, quick.
hard'-lai-wich, constipated.
harf, harp.
har'-ich-a, to hear, to listen.
här'-kum-ma, origin, source from
 which, to come from.
här'-lich, lordly, happy, jubilant.
harn, horn.
härn, brain.
harn'-e-sel, hornet.
harn'-ich, horny.
harn'-iñg, February.
härn'-shäl, skull.
härn'-shē-d'l, upper portion of cranium.
härsh, deer.
härsh'-arn-gaisht, ammonia.
härsh'-flësh, venison.
härsh'-gräs, millet.
här'-shtam'-ma, to descend from,
 origin.
härts, heart; courage.
hart, hard.
härts, gum, as an exudation on
 trees.
härts'-af-tich, courageous.
härts' fel, pericardium.
härts'-ich, resinous, gummy
härts'-ich, hearty, dear.
- härts'-klop'-pa*, palpitation of the
 heart.
härts'-shtō-sa, palpitation of the
 heart.
härts'-war-tsel, tap root.
häs, hare, rabbit.
has, hatred, dislike.
hä'-sa-glē'-a, sorrel; *lüt.*, rabbit
 clover.
hash'-bid'-el, hospital.
hash' pel, 1. a reel.
 2. a silly fellow.
has'-l-hek'-ka, hazel brush.
has'-l-nus, hazelnut.
has'-l'r, hostler.
has'-sa, to hate, to dislike.
has'-wip, cow-hide, whip.
haubt'-shtik, chief portion.
hauch, breath.
hauch'-a, to breathe; to expel
 breath through the open
 mouth.
hau'-fa, heap.
hauns, hound.
haunt, hound.
haus, 1. house.
 2. outside, out.
haus'-röd, furniture.
haus'-gshtai'-er, necessary furni-
 ture, etc., for housekeeping.
haut, skin, pelt.
ha'-wa, have; *tse ha'-wa*, to have.
ha'-was-wärt, worth having.
ha'-wer, oats.
ha'-w'r, oats.
ha'-w'r-gēs, katydid.
hē, height.
hēb'-gärn, dip net.
hēch'-er, higher.
hēchsh, highest.
hecht, pike—a fish.
hecht'-graut, pickerel-weed.
hech'-taa, to pant.
hef'-ner, potter.
heft'-ich, with strength, powerful.
hek'-l-cha, crochet needle.

- hek'-ka*, brambles, briars; dry branches or shrubs.
hek'-'l-a, to crochet.
heks, witch, sorceress.
hek'-sa-glâ-wa, belief in witches; superstition.
hek'-sa-glâ-wish, superstitious.
hek'-sa-kim'-m'l, Stramonium, jimson weed.
hek'-sar-ai, sorcery; shamanism.
hëksht, highest.
heks-'l, straw chop—for feed.
heks-'l-fü'-der, chop feed.
hē'-lar, concealer, one who hides.
hēV-mit'l, remedy.
hel, 1. clear, bright.
 2. hell, hades.
hel'-fa, to help, to assist.
helft, half.
hēV-iñg, hollow, cavity.
helm, helve.
hem, shirt.
hēm, home.
hē'-met, a home.
hēm'-g'f'il, home feeling.
hēm'-g'macht, domestic or home-made.
hēm'-lich, secret; homely, not pretty.
hem'-'r-prais, wristband.
hēm'-tsus, homeward.
hēm'-wē, home sick, yearning to be at home; *nostalgia*.
hend'-ich, handy, convenient.
heng'-'l, bunch.
henk, 1. handle.
 2. a swinging shelf.
henk'-ar, hangman.
henk'-bauch, paunch.
henk'-ka, to hang, to suspend.
henksht, stallion.
hensh'-iñg, glove, mitten.
hē'-sa, 1. heel.
 2. to command, to ask, to request.
 3. to call or designate a person or thing.
- hes'-lich*, disgusting, disagreeable, ugly, shabby.
het, had, would, could.
hēt, height.
hel'-sa, to set a dog at, to urge.
he'-wai-sa, crowbar.
hīⁿ, 1. thither, towards, to another place.
 2. exhausted, "done for."
hībsh, pretty.
hīft, hip.
hik'-ar-a, 1. hickory.
 2. to whip, or punish.
hik'-ar-i, hickory.
hik'-ar-nus, hickory nut.
hīⁿ-leñg-lich, sufficient.
hīlf, help, aid.
hīls'-n'r-ham'-ar, mallet; *lit.*, wooden hammer.
him'l, heaven; sky.
him'-'l-fart-däg', Ascension day.
himl'-lish, heavenly.
him'-mel, heaven; sky.
hi'-na, behind, back.
hi'-na-drâⁿ, behind, behind-hand.
hi'-na-drin, in the hind part.
hi'-na-druf, on the rear part.
hi'-na-naiⁿ, into, or by way of, the rear part.
hi'-na-nō', subsequently; afterwards, in the rear.
hin'-ar-gēⁿ, to deceive.
hin'-ar-lich, troublesome, obstructing.
hin'-ar-ra, to hinder, or delay.
hin'-arsht, hindmost.
hin'-ar-shunk'-a, ham; *lit.*, hind ham, in contradistinction to shoulder, "fore ham," *fel'-ar-shunk'-a*.
hin'er-em, behind the; contraction of *hin'-er dem*.
hīnk'-el, chicken, fowl; poultry.
hīnk'-el-ke'-wich, chicken coop.
hīnk'-el-shtal, chicken coop; *lit.*, chicken stable, or pen.

hin'-nich, after.

hīn'-rich'-ta, 1. to bring to ruin; to spoil.

2. to direct to a desired place.

hīn'-shīārd'-tsa, to tumble headlong.

hī'-sich, native, relative to region spoken of.

hit, hut.

hī'-ta, to guard, to watch or protect.

hīv'-mach-ārn, milliner, one who makes bonnets.

hits, heat; fever.

hit'-sa, to heat, to warm.

hits'-ich, feverish, heated.

hits'-pok-ka, prickly heat.

hī'-w'l, hill, mound, hillock.

hī'-w'l-ich, hilly, undulating.

hōch, high, elevated.

hōch'-ach ta, to esteem.

hoch'-tsich, wedding.

hōf, yard.

hop'-niñg, hope, expectation.

hok'-ka, to seat one's self.

hō'-ka, hook.

hok'-ka, to sit, to seat one's self.

The word is not a polite form.

hōl, hollow.

hō'-la, to fetch, to bring.

hō'-land-war'-ts'l, elecampane.

hol'-ler, elder (alder bush).

hols, wood.

hols'-blats, place for chopping wood.

hols'-buk, saw-buck.

hols'-kō-la, charcoal.

hōl'-wēk, sunken roadway; *lit.*, hollow way or road.

hop, hop (*pl.* *hop'-pa*—hops).

hop'l, hobble.

hop'-p'l-a, to hobble.

hōr, hair; fur, on the skin.

hos'-sa, pantaloons.

hos'-sa-dre'-ar, suspenders.

hos'-l-a, to raffle.

hot, has.

ho'-w'l, plane.

ho'-w'l-bank, carpenter's workbench

ho'-w'l-shpēn, shavings; *lit.*, plane-chips.

hud'l, tatter, rag.

hud'-la, 1. to hasten; to work in a careless manner.

2. to clean out a bake oven previous to depositing the articles to be baked.

hud'-ler, a rod with a rag attached for removing ashes from the oven.

hud'-lich, hasty, careless.

hud'v'-lum-pa, a rag used for cleaning ashes out of a bake oven.

hud'-s'l-a, uncut dried fruit.

huds'-lich, shriveled, dried.

hūf, hoof.

hūf'-ai-sa, horse shoe.

hum'-m'l, bumble-bee.

hundt, dog.

hundts'-shtal, dog kennel.

huñg'-ar, hunger.

huñg'-ar-a, to hunger, to long for.

huñg'-ar-ich, hungry.

huñg'-ars-nōd, famine.

hun'-na, down, off the top.

hun'-ich, honey.

hun'-ich-fo'gh'l, humming-bird.

hun'-ich-sok'l, honeysuckle; woodbine.

hun''rt, hundred.

hun'-rt-yēr-ich, centennial.

hun'-rt-yōr, century.

huns'-dā-gha, dog-days.

huns'-graut, toad flax.

hup'-sa, to hop, to skip.

hūr, whore, prostitute.

hūr'-a-kind, bastard; *lit.*, whore's child.

hūsh'-ta, to cough; cough.

hūt, hat.

hūl'-mach-er, hatter.

hutsh, colt.

hutsh'-el, a colt.

hutsh'-l-i, a colt.

ich, I.

im, in the; contraction of *in dem*.

im, bee.

im-ü-fres'-ser, bee eater, bee martin (*Tyrannus carolinensis*).

im'-a-kärb', bee hive; *i. e.*, bee basket.

im'-a-rös, honeycomb.

im'-ber, ginger.

im'-mens, ant.

im'-ments, ant.

im'-er, always.

im'-er-fart, always, constantly.

im'-er-mēⁿ, evermore; constantly increasing.

im'-er-wēr'-end, lasting forever.

im'-r, always.

ims, meal.

ims'-tsait, meal time.

im'-na, theirs, to them.

im'-ar-lück, internal; internally; the interior.

im'-dres-sa, interest.

im'-ga-waid, entrails, viscera.

im'-haldt, contents.

ims, in the; contraction of *in des*.

imsh, Indian.

im'-sha-rob'-er, rubber, India rubber.

imsh'-iñg, Indian; Indians.

im'-shi-nir', engineer.

im'-shiñg-rob'-ber, India rubber.

imsh'-lich, tallow.

im'-wen-nich, inside.

im'-tza, to address one with "ir," a polite form.

is, is.

ish, is (rare).

i'-wer, past, gone by; over.

i'-wer-ai'-la, to be over hasty.

i'-wer-al, everywhere.

i'-wer-aus', exceedingly.

i'-wer-bi'-da, to overbid; to outbid.

i'-wer-bin'-na, to blind over.

i'-wer-dek, coverlet.

i'-wer-drai'-wa, to overdraw; to exaggerate.

i'-wer-dref'-fa, to surpass; to excel.

i'-wer-em, over the; contraction of *i'wer dem*.

i'-wer-flus, an overflow; surplus.

i'-wer-ge-lärnd, crack-brained; *lit.*, over educated.

i'-wer'-häär'-ra, to overhear, to learn by accident.

i'-wer-handt, overhand; control.

i'-wer-haubt, generally, in general.

i'-wer-hos'-sa, overalls; *lit.*, over-pants.

i'-wer-ich, left over; not desired.

i'-wer-kshaid, conceited; *lit.*, over-wise.

i'-wer-lä-fa, to overwalk one's self.

i'-wer-lē-gha, 1. to meditate; to consider.

2. to admonish.

i'-wer-lif'-er-a, to deliver, or to hand over.

i'-wer-li'-we-ra, to deliver, or hand over.

i'wer-mach'-a, to make over; to repeat.

i'-wer-ma'-ri-ya, day after to-morrow.

i'-wer-nem'-ma, to overtake.

i'wers, over it; contraction of *i'wer es*

i'-wer-set'-sa, to translate.

i'-wer-shrift, superscription.

i'-wer-shtu-dīrt', over-studied, over-worked by study.

i'-wer-shū, overshoe; rubbers.

i'-wer-shwem'-mīng, inundation; flood.

i'-wer-sich'-lich, cross-eyed.

i'-wer-tsai'-gha, to convince.

i'-wer-tsuk, casing for feather bed.

i'-wer-tswär'-ich, 1. contrary, obstinate.

2. crosswise.

i'-wer-wai'-sa, to convince; to show proof.

i'-wer-wel'-dich-a, to overcome; to conquer.

i'-rer-win-na, to prevail ; to win over.

i'-w'l, 1. nausea ; nauseating.

2. evil, bad.

i'-w'l-a, to nauseate ; to sicken.

i'-w'l-dē'-t'r, malefactor, criminal.

i'-w'l-ich, nauseating ; nauseated.

i'-w'r, past, gone by ; over.

i'-w'r-ä-wail, after awhile ; shortly.

kabt, had ; from German *gehabt*.

ka-dol'-ish, Catholic.

kâ'-d'r, tom cat.

kâ'-fa, to buy.

kâf'-lait, merchants, purchasers.

kâf'-man, merchant, purchaser.

kâft, a notch, a gap or divide on hills or mountains.

kâf'-ta, to notch.

kâft'-ich, notched.

kaich'-a, to pant.

kai'-d'l, a wedge, a plug.

kaim, a germ.

kai'-ser, emperor.

kai'-ser-düm, empire.

kalb, calf.

kal'-basht, calabash.

kalb'-flesh, veal.

kalb'-fel, calf skin.

kalbs'-haut, calf skin.

ka-len'-ör, almanac ; calendar.

ka'-letsch, college.

kal'-ik, lime.

kal'-ik-of'-fa, lime kiln.

kal'-ik-shtōⁿ, limestone.

kalk, lime.

kal'-mus, calamus.

kalt, cold.

kal'-mō'-sel, cold chisel.

ka'-ma, cogs—of a wheel.

ka-mēv', camel.

kam'-mer, chamber ; spare-room.

ka-mil'-la, chamomile.

kam'-räd, cog-wheel.

kan, 1. a can.

2. to be able to.

kan'-d'l, spout.

kan'-d'l-tsuk'-är, rock candy.

kans'-draub, currant.

kans'-graut, St. John's wort.

kan'-shaft, familiarity with, knowledge, acquaintance with.

kan'-s'l, pulpit.

kan'-s'l-red'-ner, pulpit orator.

ka-nün', cannon.

kap', cap.

kä'-rä', 1. to sweep.

2. to belong to.

kar'-ab, basket.

ka-râⁿ'-ner, coroner.

kär'-a-pet, carpet.

ka-râ'-she, courage, pluck.

ka'-ra-si'-ra, to court, to caress.

karb, basket.

kar'-'b, basket.

kär'-ber, body.

karb'-wai-de, basket willow.

kârd, 1. cord ; yarn.

2. a card ; chart.

kär'-dūⁿ, calico, prints.

kär'-dün, calico, prints.

kär'-frai'-dâk, Good-Friday.

kar'-ich, cart.

kär'-ich, church.

ka-rel', bead.

kär'-ich-a-râd', church council ; vestry.

kär'-ich-a-shdül, pew.

kär'-ich-a-sits, pew.

kär'-ich-höf, church yard, grave yard.

kar'-ik, cork.

kar'-ik-ka, to cork.

kar'-ik-tsī'-gher, cork screw.

kârl, fellow.

karn, rye.

kärn, kernel, seed.

karn'-bröd, rye bread.

kâr'-nish, cornice.

kärsh, cherry.

karts, short.

kärts'-lich, lately, shortly.

karts'-sich-tich, short-sighted, near-sighted.

kash'-da, cage, case, box, chest.

kats, cat.

kat'-sa-ge-grish', caterwauling.

kat'-sà-graut, catmint.

kau'-a, to chew, to masticate.

kaum, scarcely, hardly.

keⁿ, none, not any; contraction of *ken'-ni*, none.

ked, chain.

kef'-fer, bug, beetle.

kft'-lich, notched.

kel, trowel.

kël, throat, trachea.

kelch, cup, chalice.

kel'-lar, cellar; a vault.

kel'-lar-kich', basement kitchen.

keⁿ-mol, no time; at no time.

keⁿ-nich, king.

keⁿ-nich-en, queen.

keⁿ-nich-raich, kingdom.

ken'-na, 1. to be able.

2. to know, to be acquainted with

ken'-ni, none, none of them.

ken'-mol, not once, at no time.

kens, none.

kent, could.

ken'-tsëch-a, property mark; sign by which a thing may be recognized.

kër, 1. care, responsibility.

2. hearing, sense of hearing.

kër'-ra, to sweep.

kës, cheese.

keshdt, chestnut.

keshd'-igh'l, chestnut burr.

keshd'-lich, costly, expensive.

kës'-sa', colander; *lit.*, cheese sieve.

kes'-s'l, kettle.

kes'-s'l-flik'-er, a tinker; *lit.*, kettle mender.

ket, chain.

ketsh, a catch, puzzle, trick.

ketsh'-'r, pall.

ke'-wich, cage.

kî'-ben, cowpen.

kî'-bid-ars, tansy.

kî'-blum, dandelion.

kich, kitchen.

ki'-drek, cow dung.

kî'-drek-rol'-ler, tumble-bug; *scara-bus*.

kîl, cool.

kî'-la, to cool.

kim'-er-lich, poorly, indigent, needy.

kim'-'l, caraway.

kî'-mish, cow manure.

kin, chin.

kin'-bak'-ka, jaw bone.

kind'-hëd, childhood.

kind'-lich, filial.

kindsh'-lar, expert, artist, one who can adapt himself to various delicate operations.

kin'-nish, foolish, childish, silly.

kindt, child.

kin'-ner, children.

kin'-ner-dîb, kidnapper; *lit.*, children-thief.

kinsht'-'r-ai', pow-wow-ing; the ability to perform mysteries; also applied to spiritualistic performances.

kins'-kind, child's child = grand-child.

kî'-rûs, lampblack.

kishd, a chest.

kî'-shâr, cow bunting; cow black-bird.

kis'-'l, sleet.

kis'-'l-a, to sleet.

kis'-'l-ich, sleety.

kis'-sa, a pillow.

kit, putty.

kîl'-'l, a long loose coat.

kitsh, a scraper; a rake made of a board, transverse to the handle, for removing ashes from a bake oven.

kîl'-s'l-a, to tickle.

kîts'-lich, ticklish; delicate.

- klai'*, soon.
klai'-a, bran.
klam, clamp; clothes-pin.
kläm'-mer, lamentation.
klāng, a clang—as of a bell.
klār-a-net', clarionet.
klā-għa, to complain.
klāg, complaint.
klap'-bört, clapboard; strip of wood for pail fence.
klas, class.
klē'-a, clover.
klēⁿ, small.
klēch, link.
klēd, article of dress.
klē'-da, to clothe.
klē'-d'r, clothing.
klē'-d'r-kam'-mer, wardrobe.
klē'-d'r-shtub, wardrobe.
klem'-ma, to pinch, to wedge, to jamb.
klen'-ar, smaller.
klēn'-nich-kēd, trifle.
klenshd, smallest.
klep'-er-a, to rattle.
klep'-er-ich, rattling, worn out so as to rattle; rickety.
klet, } burdock.
klet'-ta, }
klid'-sha, to slip.
klidsh'-ich, slippery; icy.
klik, luck, a happening.
klik'-ka, to happen, to occur.
klik'-lich, lucky, fortunate.
klīm'-b'l, a small heap or mass.
klīng, a blade.
klīng'²l, a ball; a small round bell containing a ball; used for sleigh bells.
klīng'²l-a, to jingle; to cause ringing of small bells—as sleigh bells.
klīng'²l-sak, } a small bag, at-
klīng'²l-sek'²l, } tached to a long pole, having a little bell attached. Used in churches for taking up collections.
- klīng'-shtōⁿ*, clingstone; applied to a variety of peaches.
klō'-a, claws; cloven foot.
klō'-a-fet, neat's-foot oil.
klōf'-ter, a cord—as of wood.
klōf'-ter-hols, cord wood; forest trees which are intended for cord wood.
klok, bell.
klok'-ka-blum, columbine; *lit.*, bell flower.
klop'-pa, to knock, to pound with a hammer or other instrument.
klop'-hengshd, a stallion from which one testicle has been removed.
klōr, clear, pure.
klō'-ra, to clear, to purify.
klots, block.
klūgh, intelligent, erudite.
kluk, brood hen; an old hen.
kluk'-ka, to cluck, like a hen.
kluk'-sa, to cluck, like a hen.
klum'-pa, a lump, a heap, a bunch.
klum'-pich, lumpy.
klum'-sich, clumsy, bungling.
knab, shoemaker's knife.
knak, knot; skein.
knak'-ka, to crack—as nuts.
knak'-warsht, hard smoked sausage.
knal, a clap, as of thunder; a sharp loud report.
knaps, scarcely; close, stingy.
knar'-a-w'l, gristle.
knar'-a-w'lich, cartilaginous.
knar'-ich, 1. knotty.
 2. given to grumbling.
knar'-ra, 1. to snarl or growl; to grumble.
 2. a knot—as on a tree, or in wood.
knār'-sha, to gnash, to grate.
knā'-wa-ra, to gnaw; to nibble at.
knep'-pa, to button.
kne'-w'l, a stick used for twisting; a gag.
knē, knee; angle in a stove-pipe.
knē'-a, to kneel.

knik'-ka, to break, without separation of pieces.

knip'-'l, a club.

knī'-rīm, shoemaker's strap.

knī'-ri-ma, shoemaker's strap for holding the shoe to the top of the knee, in mending.

knī'-shaiḅ, knee pan—patella.

knī'-wand, the wall of a house extending from the floor of the garret to the roof.

knech'-'l, a small bone; a joint of the fingers.

knecht, male servant; hired man for farm work.

knoch'-a, bone, bones.

knoch'-a-man, skeleton.

knoch'-a-mēl, bone dust.

knoch'-a-gār-i-gh'l, skeleton.

knoch'-ich, bony, lean.

knod'-d'l, 1. a lump.

2. an awkward fellow.

knod'-er-a, to grumble.

knod'-'l, a small lump.

knod'-'lch, 1. given to grumbling.

2. precarious, meagre or with poor success.

knod'-'l-sup, a soup made of small hard lumps of dough. The more frequent term is *ri'-w'l-sup*.

knop, button, a knot.

knop'-loch, button hole.

kno'-w'loch, garlic.

koch, cook.

koch'-a, to boil, to cook.

koch'-ap-p'l, apples fit for baking or boiling.

koch'-flēsh, meat for boiling.

koch'-haf'-fa, boiling pot.

koch'-ich, boiling hot.

koch'-kes-s'l, kettle for boiling.

koch'-lef'-'l, ladle.

koch'-of'-fa, cooking stove.

koch'-pan, sauce-pan.

ko'-la, coal.

kō'-la-bren'-ner, charcoal burner.

kō'-la-ēⁿ-mer, coal scuttle.

kō'-la-grüb, coal mine.

kōl'-ēl, kerosine—coal oil.

kol'-ik, colic.

kol'-of'-fa, coal stove.

kol'-wa, ear of corn; core.

kop, head.

kop'-chü, cup.

kop'-pa-kis'-sa, pillow; *lit.*, head pillow, or cushion.

kop'-shmär-tsa, headache.

kop'-wē, headache.

kōr, choir.

ko'-ri-an'-der, coriander.

kosh'-da, costs, expenses.

kosht, 1. food, board or boarding.

2. cost, value.

kosh'-tard, custard.

kosht'-bâr, costly, expensive.

kosht'-geñg-er, boarder.

kots, vomit.

kot'-sa, to vomit.

krach, a crash; the sound of a gun discharge.

krach'-a, a crash, a cracking sound.

krad'-'l-a, to crawl, to climb.

krad'-'l-ich, crawling, sprawling.

krad'-sa, to scratch.

krad'-sich, irritating, pungent.

kraft, vigor, strength.

kraïd, chalk.

kraïds, a cross.

kraïds'-lâm, lame in the hip-joint; hip shot.

kraïds'-wēk, cross-road.

kraïs, circle.

kraï'-sha, to cry out, to yell, to shout.

kramp, cramp.

krân, a crown.

krâⁿ-na, 1. a barb of an ear of grain.

2. fish-bones—particularly the thin long ones—ribs.

3. to crown.

krank, sick.
krank'-hēt, sickness.
krap, crow.
krans, wreath, garland.
kr̄aut, cabbage, weeds ; plants.
kr̄aut'-ho'-w'l, cabbage cutter—for
 slaw ; *lit.*, cabbage plane.
kra'-w'l-a, to crawl, to creep.
kra'-w'l-ich, creeping, crawling.
kr̄a-yer, a crier.
kre'-a, to crow ; to boast.
kre'-āk, corn, sometimes applied to
 a bunion.
krebs, 1. a crab.
 2. cancer.
kreds, itch—cutaneous affection.
kref'-ta, strength, vigor.
kref'-ich, vigorous, strong.
krem'-b̄ir, cranberry.
kr̄ō'-mer, peddler.
kr̄ō'-mer-a, to peddle ; to carry
 around for sale.
krenk-ka, to grieve, to regret.
krenk'-l-a, to complain of sickness ;
 to take sick.
krenk'-lich, sickly, delicate.
kr̄ō'-ser, larger.
krets, itch—cutaneous disease.
krids'-l-a, to scribble.
krid'-s'l-ar, a scribbler.
kr̄ig, war.
kr̄i'-gha, 1. to get, to receive, to
 procure.
 2. to war with one another, as
 nations.
kr̄i'-gher, warrior.
kr̄ik, war.
krik, 1. a creek ; small stream.
 2. a crutch.
krik'-a-fish, fish taken from fresh-
 water streams, in con-
 tradistinction to salt-water
 fish.
krik'-s'l, cricket.
kr̄im'-l-a, to crumble.
kr̄im'-lich, brittle, crumbling.

kr̄ish, a cry, a scream, a shout.
kr̄ishd'-kind'l, Christmas gifts ; *lit.*,
 little Christ child.
kr̄ish'-kin-d'l, Santa Claus.
kr̄isht'-d̄ag, Christmas.
kr̄isht'-war-ta'l, hellebore.
kr̄is'-l, a thrill, a shock, a chill.
kr̄is'-lich, horrible, shocking.
krol, curl.
krol' la, to curl.
krol'-ler, a variety of cake, made
 similar to doughnuts. In
 some localities they are con-
 sidered identical.
krol'-lich, curly.
kr̄ō'-ner, coroner.
krop, 1. crawl.
 2. rude, coarse.
kro'-w'l-a, to grumble ; to fumble,
 to grovel.
krud'-sa, core—of fruit ; cob—of
 corn.
krud'-sich, 1. full of cores.
 2. miserable, "from hand to
 mouth."
 3. stunted, meagre.
kruk, jug, pitcher, crock.
krum, crooked, curved.
krusht, crust.
krusht'-ich, crusty.
krus'-s'l-b̄ir, gooseberry.
kshdik, cannon.
kshlar-af'-fa k̄sicht, mask or false-
 face.
kshpensht, apparition.
kshwai, sister-in-law.
kshwair, justice of the peace.
kshwä'-ra, a boil, boils.
ksims, a strip of wood extending
 around the walls of a room,
 to prevent chair backs
 from injuring the plaster-
 ing.
kū, cow.
kuch'-a, cake, cakes.
kuch'-a-plat, griddle.

kuch'-ä-rel-cha, a small instrument for cutting and decorating pie dough; consists of a small wheel at the end of a handle, similar to a wheel-barrow in construction. The wheels are usually serrated, or have an undulating periphery.

kud'-'ld, 1. tangled.

2. hurried, bungled.

kud'-'l-flek, tripe.

ku'-gh'l, bullet, ball.

kum-a-räd', comrade.

kum'-bas, compass.

kum'-et, horse collar.

kum-ël', comet.

kum'-et-dek, housing.

kum'-et-shpëⁿ, hames.

kum'-ma, to come.

kun'-na, 1. customers, patrons.

2. importance, important facts or results.

kun'-shaft, custom.

kunsh, skill, art.

kun'-shtâ-w'l, constable.

kun'-shtâ-w'ler, constable.

kup'-per, copper.

kup'-per-kop, copperhead—snake.

kup'-p'r, copper.

ku'-rûs, copperas.

kutsh, coach.

kwed'-sha, 1. plums, prunes.

2. to bruise, to squeeze.

kwek'-sil-wer, mercury; quicksilver.

kwel, spring.

kwël, bother, torment, annoyance.

kwë'-la, to torment, to worry or annoy.

kwël'-la, to dampen or moisten so as to cause swelling; to boil.

kwë'-lich, tormenting, worrying.

kwën'-d'l, thyme.

kwët, quoit.

kwilt, a quilt.

kwil'-ta, to quilt.

kwilt'-iñg, a quilting; quilting party.

kwit, quince.

k'wit'-ter, lightning.

k'wit'-er-a, 1. to thunder and lightning.

2. threatening thunder storm.

kwol'-la-flësh, dry-beef.

kwot-em'-ber, Ember days.

lân, wages, salary.

lâb, foliage; dry leaves upon the ground, as found in woods.

lâb'-frosk, tree frog.

lach'-a, to laugh.

lâd, 1. a load.

2. coffin.

lâ'-da, 1. to load.

2. a window shutter.

lâd'-iñg, gun charge, a load.

lâd'-môs, measure for ammunition for a gun.

lâd'-shtek-ka, ram-rod.

lâf, gun barrel.

lâ'-fa, to walk, to go.

lâf'-tsait, rutting season.

lâ'-gher, a resort, a place to lie.

lâ'-gha-ra, to lie down.

lâ'-ghar-fër, camp meeting.

lâyk, lye.

lai'-a, to lie down, to recline.

lai'-ar, monotony, rut, the same way, sameness; *âlt lai'-ar*, "the same old thing."

lai'-a-ra, to accomplish slowly.

laib, body.

laib'-haft-ich, bodily, with energy, vigorous.

laib'-shmär-tsa, pain in the stomach or bowels.

laib'-wë, 1. pain in the stomach.

2. diarrhœa.

laicht, 1. light (in weight); easy.

2. light (in color).

3. a funeral.

laich'-ta, 1. to lighten, to relieve.

2. to ignite, to light.

laicht'-fî-sich, light-footed, swift.

laichl'-sin-nich, thoughtless, fickle.

lai'-da, 1. to suffer, to endure.

2. cares, sufferings.

laid'-lich, agreeable.

laim, glue.

lai'-ma, to glue.

laim'-ich, gluey, sticky.

laim'-led-'r, scraps of leather; leather shavings.

lain, a line; a course.

lai'-na, 1. to line.

2. linen, made of linen.

lain'-duch, bed sheet, linen sheet.

lain'-öl-ich, linseed oil.

laishd, 1. lath, a slat of wood.

2. a shoemaker's last.

laishd'-ho'-w'l, head plane.

laishd'-na-gh'l, lath nail.

laishd'-ta, to lathe, or to nail laths.

lait, people, folks.

lait'-hârs, cavalry.

lak-sî'-ra, to purge; to physic.

lak-sîr'-iñg, purgative; cathartic.

lam, lamb.

lâm, lame.

lâ'-mē-sich, law-abiding; according to law; legal.

lam'-'l, a lubberly, awkward fellow.

lam'-tsait, ewing season.

lan', shaft—of carriage.

land, land, country.

lând'-e-ghner, land-owner; proprietor of lands, or farm.

land'-kârt, map, chart.

land'-mes-ser, surveyor.

land'-re-gha, a settled rain; *lit.*, land rain.

land'-shaft, landscape, region, area of territory.

land'-shilt'-krot, tortoise; *lit.*, land turtle.

lîñg, long, length.

lîñg'-a, to reach, to hand.

lîñg'-kwid, connecting pole of a wagon.

lîñg'-lich, oblong, lengthy.

lîñg'-lich rund, oval.

lîñg'-mî-dîch, enduring, forbearing.

lîñg'-ôr', long-ear; sometimes used to denote an ass or mule.

lîñg'-sam, slowly, tediously.

lîñg'-sâm, slowly, tediously.

lîñg'-sich-tich, long-sighted (presbyopia).

lîñg'-wêr-ich, tedious, lasting.

lands'-man, countryman, one from the rural district.

larb'-sa, to speak with an indistinct and guttural voice.

larbs'-ich, in an indistinct or guttural voice; drawling.

lâr'-ich, meadow lark (*Sturnella magna*).

lâr'-'m, alarm, noise.

lâr'-ma, 1. to alarm; to make a noise.

2. noise, alarm.

lâr'-na, to learn, to acquire.

lârñ'-iñg, learning.

lasht, a burden, a charge.

lash'-der-haft, vicious.

las'-ich-kêdt, lassitude, indisposition.

lat, lath.

lât, coffin.

la-târñ', lantern.

lat'-wâr-ik, apple butter.

laud, loud, with noise.

laudt, loud, with noise.

lau'-er-a, to listen, to be on the watch for obtaining information.

laud'-'r, nothing but; only.

laus, louse.

laus'-ich, lousy.

laut, loud, with noise.

lêñ, alone, solitary.

lêb, 1. lion.

2. a loaf.

leb'-ar-a, to sip, to tipple.

leb'-dâk, during life.

lêb'-haft, lively, vivacious.

leb'-kuch'-a, honey cakes.

- leb'-pish*, flat in taste, unsavory.
leb-raich, benevolent, kind.
lech-ar, holes; *pl.* of *loch*.
lech'-ar-ich, full of holes, or openings.
lech'-ar-lich, laughable, amusing.
lech'-'l, a small hole; a small opening.
léd, sorrow, regret.
léd-da, tired of; to have disgust.
led'-ar, leather.
léd-der, ladder.
léd-der-bâm, ladder beams.
léd-der-shpross'-sa, rounds of a ladder.
léd-der-wa'-gha, wagon with rack, for carrying hay or grain.
led'-ich, single, not married.
léd-dich, tired of, wearied.
led'-ich-ar-nâ-ma, maiden name; *lit.*, single name.
led'-'l, lath.
led'-'rn, of leather, leathern.
ledsht, the last, final.
led'-t'l, lath.
led'-t'r-a, 1. to whip, to beat.
 2. to leather or to cover with leather.
ledtsh, latch.
léd-far, runner (*shliu'-ta léd-far*, sleigh runner).
léd-far-sai, shoats.
lefts, lip.
lef'-'l, spoon, dipper.
lég'-âi, nest egg.
lég'-ai-sa, axle plate.
léd-gha, to lay, to put, to place.
lég'-hink'-el, a laying hen.
léd-gh'l-a, to deny.
lek'-shan-nî'-ra, to canvass, to electioneer.
léd-lak, lilac.
léd'-ma, clay.
léd'-mich, clayey.
léd-mîd-ich, sorrowful, downcast.
len, lane, a narrow roadway seldom used, and generally private.
- lén'-na*, to lend; to loan.
lend'-lich, rural, pertaining to the country.
len'-er, garden beds, arranged for plants.
lén'g, length.
lén'g'-lich, lengthy.
lén'gsh't, long ago, length.
léd-nich, lonely, lonesome.
lér, empty; learning.
léd-ra, to learn; to educate, to teach.
léd'-sa, 1. to read.
 2. to pick up, to gather.
lesh'-a, to quench.
lesh'-der, annoyance; trouble, a bore.
lesh'-der-a, to annoy, to blaspheme; to slander.
leshdt, a last (—used by cobblers).
lets, 1. wrong, not correct.
 2. turned wrong side out.
let'shta, the last.
let'-ta, clay.
léd'-wa, to live, to exist.
léd'-wa-lân'g, life long.
léd'-was, life, during a life-time; experience.
léd'-was-far-sich'-er-iñ'g, life insurance.
léd'-was-gfôr, in danger of life.
léd'-wa'-shtrôf, capital punishment.
léd'-was-tsait, life-time.
léd'-wa-wôl, live well; a farewell wish.
le-wen'-dich, alive, living.
le'-wer, liver.
le'-wer-warsh't, liver pudding; *lit.*, liver sausage.
le'-w'r-graut, liverwort.
lîb, love, affection.
lîb'-ha-w'r, lover, admirer.
lîb'-lich, lovely, savory.
licht, light, candle, lamp.
licht'-bud-ser, snuffers.
licht'-mes, candlemas.
licht'-r-fârm, mould for making tallow candles.

licht'-'r-mach-er, tallow chandler.

lid, hymn.

lī'-da, 1. to solder.

2. to lead.

lifd'-'ich, airy, breezy.

lī'-gha, to lie, to falsify.

lī'-ghnar, liar.

līgk, a lie.

lik, a gap, a space; an unoccupied place.

lik'-ar, liquor; usually applied to whisky.

lil'-ya, lily.

līng'-'l, a wild fellow, one full of mischief.

links, left, to the left; left-handed.

līn'-na, linden tree, or wood.

lish'-da, to enlist; to enroll.

lishdt, list.

lit'-l-haus, an isolated water closet, or privy.

lī'-wa, to love.

lī'-wi, sweetheart, a dear one (applied to females).

lī'-w'r, a dear one (applied to male), a lover.

lō, tan; crushed oak bark for tanning hides.

lōb, praise, love.

loch, hole, opening.

loch'-sēk, a narrow bladed handsaw for scroll work.

lōd', a load.

lō'-d'l, a loafer; a tippler.

lō'-d'l-a, to loaf, to idle.

lō-dri', lottery.

lō'-fen'-d'l, lavender.

lok'-ka, 1. to call, to entice.

2. a lock of wool.

lok'-ish, having locks.

lō'-kus, 1. a locust (*cicada*).

2. locust tree.

lop'-pa, a flap, rag, patch.

lō'-rōd, tan colored; *lit.*, tan red.

lōs, 1. loose, not secured.

2. a sow.

los, 1. let, allow.

2. negligent, careless; the word *las* is generally used.

lōs'-brech-a, to break away, to escape.

losh'-der, vice.

lōs'-kâ-fa, to ransom.

lōs'-kum'-ma, to get off, to get free, to escape.

lōs'-los-sa, to liberate, to set off or free.

lōs'-mach-a, to loosen, to untie.

lōs'-rai-sa, to tear off; to break away.

lōs'-shī'-sa, to shoot off.

lōs'-shrau-wa, to unscrew.

lot, a lot.

lot'-tar-ī', lottery.

lō'-wârm, luke-warm, tepid.

lūⁿ, wages, salary.

lū'-d'r, carrion.

lū'-d'r-fo-gh'l, turkey buzzard; *lit.*, carrion bird.

lud'-'r-ish, Lutheran.

luft, air, breeze.

luft'-rōr, trachea; air-tube.

lū'-na, linchpin.

luks, lynx.

lum'-er-ich, limber, flaccid.

lum'-pa, rag, rags.

lump'-ich, ragged.

luñg, lung.

luñg'-a-graut, lungwort.

lush'-da, desire, want, delight.

lush'-dar-a, to have desire, to want.

lush'-dar-ich, luscious.

lush'-dich, joyful, merry.

lut'-ser, lantern.

'*m*, '*m-a*', 1. prefixed to a noun, and the latter followed by *saiⁿ*—his, completes possession; equivalent to the apostrophe preceding '*s* in English—to form the possessive case.

2. Also signifying to a, for a, with a, etc., the particular shade of meaning depending upon context.

mach'-a, to make, to do; to hasten.

mâd, maid, a female servant.

ma-dē'-riñg, pus, matter.

mâg, 1. may.

2. poppy.

mâ'-gha, stomach.

mâ'-gha-bal'-sam, mint.

mâ'-gha-kramp, stomach cramp.

mâ'-gher, lean; unproductive.

ma^v, my, mine.

mag'-net, magnet.

mâi, May.

mâi'-ab'-p'l, May-apple—fruit of *Podophyllum peltatum*.

mâi-blum, lily of the valley; *lit.*, May-flower.

maï'-da, to shun, to quit.

maïl, mile.

maïl'-shîⁿ, milestone.

main'-da, 1. to mind; to heed.

2. to extract ore from a mine.

maindt, ore; ore mine.

maind'-ta, to dig ore; to work an ore mine.

maï'-ner, mine; refers to a substantive masculine.

maï'-ni, mine; refers to a substantive feminine.

maïns, mine; refers to possession, of a substantive of neuter gender, or one of diminutive form.

maïs'-chia-shtil, extremely quite; *lit.*, as still as a mouse.

maïs'-ô-ra, saxifrage.

mâi-ya, to go Maying; to celebrate the first of May by having picnics or excursions into the woods.

mâ'-la, to grind.

mâl'-tsait, meal time.

mals, malt.

mâm, mamma, mother.

mam'-mi, mammy; *i. e.*, mother.

man, husband; man.

mâⁿ-na, 1. mane, manes.

2. to moan, to lament.

mân'-dâk, Monday.

man'-d'l, mantle cloak.

man'-d'l-kârⁿ, almond.

mândt, moon.

mândt'-shâ^v, moon's light; moon-shine.

mândt'-un-er-ga^{ñg}, setting of the moon.

mâⁿ-net, month.

mang'l, 1. want, destitution.

2. craving or desire for.

mang'l-a, to crave, to want.

mang'l'-haft, unsatisfactory.

man'-ich-er, many-a-one—refers to masculine gender.

man'-ich-faldt, the third stomach of ruminants.

man'-ich-es, many-a-one; refers to neuter gender.

man'-ich-i, many-a-one; refers to feminine gender.

ma-nîr', manners, habit.

ma-nîr'-lich, well-behaved, polite.

ma-nîr'-lich-kêd, politeness.

man'-shaft, crew; garrison.

mans'-lait, men, gentlemen; males.

mâr, mare.

mâ'-râ-âi', cocoanut; *lit.*, mare's egg.

ma-râl', moral; morality.

ma-râl'-ish, moral.

ma-rân', sweet marjoram.

mârb, ripe, tender.

mâr'-dar, murder.

mâr'-dar-a, to murder.

mâr'-dar-ar, murderer.

marâ'-bren-ner, incendiary.

marâ'-dâdt, murder.

mârdts, March.

mar'-ik, market.

mâr'-ik, mark, sign.

mār'ik-ka, to mark.
mar'iks, marrow.
mārkl-wār-tich, remarkable, wonderful.
mārsh'er, a mortar.
mar'ya, to-morrow.
mar'ya-shtund, morning, daybreak.
mar'yeds, in the morning.
mashd, 1. fattening.
 2. luxuriant (growth of plants).
mashd'-sai, fattening hogs.
mash'-sau, a hog fattening for slaughter.
mash'-därm, rectum.
mat, faint, weak, debilitated.
mat'-ich-kēd, debility, faintness.
maul, mouth, opening.
maul'a, to give impudence; to grumble.
maul'-bir, mulberry.
maul'-ē-sel, mule.
maul'-fol, mouthful.
maul'-ich, saucy, impertinent.
maul'-karb, muzzle; *lit.*, mouth basket.
maul'-uf-shpār'-ra, to yawn, to gape.
maul'-warf, mole.
maul'r, wall.
maul'r-ar, mason.
maul'r-senk'-el, plumb-bob.
maus, mouse.
maul'-sa, 1. to catch mice (as a cat).
 2. to molt, to shed the hair.
maus'-dōd, dead, equal to the common expression "stone dead."
maus'-fal, mouse trap.
maus'-kats, a mouser.
maus'-ōr, saxifrage.
maus'-tsait, molting season.
mēⁿ, more.
mē'-a, to mow, to reap.
mē'-bla, maple.
mēb'-lais, tick seed.
mecht, might, strength.
mecht'-ich, mighty, powerful.
med'-ar-la, feather few.

med-a-tsūn', medicine.
mēd'-chia, a little girl.
mēd''l, girl.
med'-s'l-a, to massacre; to chop up.
mēdt', 1. girls.
 2. the place (and time) where mowing is done.
mē'gha, to be allowed, to have liberty.
mēg'-lich, possible; probable.
mēg'-na-tai'-sa, to mesmerize; to magnetize.
mēksh't, might.
mēl, meal, flour.
mēl'-da, to report, to announce.
mē'-lich, mealy.
mēl'-ka, to milk.
mēl'-sup, porridge; pap.
mēm, mother.
mē'-na, to mean, to think, to intend; to believe or have an opinion.
mēn'-chia, male of birds, etc.; *lit.*, little man.
mēⁿ'-ner, more.
mēng'-a, to mix.
mēn'-iñg, opinion; meaning; signification.
mēnsh, person, being, man.
mēn'-sha, people, inhabitants.
mēn'-sha-al'-der, generation.
mēn'-sha-faind, misanthrope; an enemy to human beings.
mēnsh'a-far-shtand', common intelligence; common sense.
mēn'-sha-fraind, philanthropist.
mēn'-sha-hilf, human aid.
mēnsh'-hēd, humanity, human kind.
mēnsh'-tens, mostly, generally.
mēr, to me; we; one.
mē' red-ich, horse-radish.
mēr'-hait, majority.
mes, brass.
mesh'ta, 1. to feed for fattening.
 2. to remove manure from a pen, or stall, and supply fresh bedding.

mes'-sa, 1. to measure.

2. brazen; of brass.

mes'-sar, 1. knife.

2. one who measures.

mes'-sar-klīng, knife blade.

mē'-sel, chisel.

mē'-sel-a, to chisel, to join.

mēsh'd'r, master.

mēsh'd'r-wart-s'l, master-wort.

mē'-sich, frugal.

mī, pains, labor pains, trouble;
concern.

mīch, me.

mīd, middle.

mīd'-da, in the middle; between.

mīd'-dāk, midday, noon; dinner.

mīd'-dāk-es'-sa, dinner.

mī'-dīch-kēd, lassitude.

mīd'l, sore hand; sometimes ap-
plied to a felon.

mīd'-'l-a, to meddle.

mīd'-'l-ar, a mediator, a "middle-
man."

mīd'-'l-bār, mediate.

mīd'-'l-mēl, middlings — second
grade of flour.

mīd'-'l-mē-sich, tolerable, moderate.

mīd'-'l-mōs, average; *lit.*, middle
measure.

mīd'-'l-punk-ka, centre, centre point.

mīd'-ter-nacht, midnight.

mīd'-t'l, remedy.

mīd'-woch, Wednesday.

mī'-ghlich, possible.

mīk, fly.

mīk'-ka-blash'-der, fly plaster (can-
tharides).

mīk'-ka-gārn, fly net—for horses.

mīk'-ka-g'shār, fly net for horses;
lit., fly harness.

mīk'-s'l-fū'-der, mixed feed for ani-
mals.

mīl, mill.

mīl'-daich, mill pond, a race.

mīl'-dam, milddam.

mīl'-dau, mildew.

mīl'-īch, milk.

mīl'-īch-graut, milk weed.

mīl'-īch-haus, dairy.

mīl'-īch-hör, down, of the cheeks;
lit., milk hair.

mīl'-īch-kel'-lar, cellar where milk
is kept.

mīl'-īch-saft, chyle.

mīl'-īch-sai', milk strainer.

mīl'-īts', militia.

mīl'-lar, miller.

mīl'-mach-er, millwright.

mīls, spleen.

mīls'-īch, melancholy.

mīls'-krank-et, melancholia.

mīls'-krank-hēt', melancholia.

mīl'-shlāb, dust or sweepings of a
grist mill.

mīl'-yān', million.

mīl'-yūn', million (frequently used
in the rural districts).

mīn-udt', minute.

mīr, we.

mī'-sēl-īch, wearisome.

mī'-sēl-īch-kēd, wearisomeness.

mī'-sich, idle.

mī'-sich-gāng, habitual idleness.

mīs'-brauch-a, to misuse; to abuse.

mīs'-drau-a, to distrust; to mistrust.

mīs'-drau-īsh, suspicious.

mīs'-far-gunt', envy.

mīs'-far-shtend'-nīs, misunderstand-
ing.

mīs-fō'-la, to displease.

mīs-fol'-ya, to disobey.

mīs'-gun-nish, envious.

mīs'-gunshd, envy.

mīsh'-bla, persimmons.

mīshd'-hōf, dung yard; barn yard.

mīshdt, dung, manure.

mīsh'-ta, to manure, to remove man-
ure from stalls.

mīs'-lich, uncertain.

mīs'-sa, 1. to be obliged, must.

2. to miss, to fail to meet, or
accomplish.

mis'-s'r-â-w'l, miserable; wretched.

mit, with, along; middle.

mit'-brîng-a, to bring along with; to contribute.

mit'-gfîl, sympathy.

mit'-hel-fa, to assist; to aid.

mit'-helf-es, assistance; charity.

mit'-hîlf, assistance, aid.

mit'l, remedy.

mit'-laidt, sympathy.

mit-lai-das, sympathy.

mit'-lok'-ka, to entice; to call along with, or away.

mit'-mach-a, to take part; to participate.

mits, mittens.

mod'-el, a mould, or pattern; a model.

mod'-'l-a, to model, to mould.

möl. 1. time; once; once on a time.

Also pronounced in various localities as *e-möl'*.

2. a mark, *næva materna*.

mō'-la, to draw, with pencil or pen.

mō'-lar, a draughtsman; one who draws.

mo-las'-es, molasses.

mo-las'-îch, molasses.

mō'ler, 1. a mole, or mark upon the skin.

2. a draughtsman.

mō'-li, once; corruption of *ēⁿ'-mol*.

mol'-ka, whey.

mops'-kop, a dull fellow; a mope.

mo-rasht', morass, mud.

mōs, 1. moss.

2. measure (of capacity).

mōsh'-kop, "mush-head," a stupid fellow.

mos-tîn', muslin.

mos'-s'l-în', muslin.

mūd'-îch, moody, spirited.

mūd'-lōs, dejected; without energy.

mūd'-mâ-sa, to surmise, to conjecture.

mud'-'r-graut, mother-wort.

mud'-'r-kärn, the black grains found in rye, known as ergot.

mud'-'r-ucē, pressure within the stomach and œsophagus, caused by indigestion, etc.—hysteria.

mūd't, mood, condition, disposition.

mud'-'t'r, 1. mother.

2. womb.

3. mother—of vinegar.

4. burr of a screw.

mud'-'t'r-shōf, ewe.

mud'-'t'r-shprōch, mother tongue.

muk, a fly.

mul'-li-kop, tadpole.

mund'-er, active, lively; well.

mus, must.

mush'-der, pattern.

mush-kâd'-nis, nutmeg; nutmegs.

mush-kâd'-nus, nutmeg.

mush'-kēd, musket.

mush'-kîl'-ter, mosquito.

mush'-'l, muscle (—bivalve).

mut'-'tō, motto.

'n, 1. contraction of German *ein*, *einen*, *eines*; as a prefix, or preceding a word signifies a, an.

2. contraction of German *ihn*, *ihnen*, *es*; as a suffix, or following a word, signifies him, them, to them.

nâb, hub—of a wheel.

nacht, night.

nacht'-haf'-fa, chamber pot.

nacht'-es-sa, supper.

nacht'-möl, Communion; the Lord's Supper.

nacht'-wech-der, night watchman.

na-dîr'-lich, natural.

na-dîr'-lich-ar-wais', naturally; in the course of events.

na-dîr'-lich-kēd, natural, naturalness.

na-dur', nature.

na-dūr'-gâ-wa, natural gifts; talents.
na-dūr'-ken-ner, naturalist.
nâ'-e, near, neighborhood of.
nâ'-gha, to gnaw.
nâ'-ghas, a gnawing; remorse.
na'-gh'l, nail.
na'-gh'l a, to nail.
na'-gh'l-bō'-ra, gimlet.
na'-gh'l-fasht, immovable, fixed.
na'-gh'l-flus, whitlow.
nai, new.
naiⁿ, in, into.
naiⁿ-brech-a, to break in; to burglarize.
naiⁿ-brîng-a, to bring in, or into.
naid, envy.
nai'-dich, envious.
nai'-gâr-ish, inquisitive.
nai'-ich-kē'-da, news.
naiⁿ-laich-ta, to light one into an apartment; to show to a room by also carrying a light.
nai'-lich, lately, recently.
nai' licht, new moon; *lit.*, new light.
naiⁿ-na, nine.
naiⁿ-sēⁿ-na, to understand; to comprehend; *lit.*, to see into.
naiⁿ-shpār-ra, to lock, or bolt into; to secure.
naiⁿ-shtim-ma, to elect to office.
nak'-ich, naked; bare.
nâ'-ma, 1. a name.
 2. to name.
nâ'-ma-buch, dictionary.
nâ'-mens, by the name of; named.
nan'-ner, together, one another.
nar, fool.
nar'-a-drêch, foolishness.
nar'-a-haus, insane asylum.
nar'-a-shtrech, an act of foolishness.
nardt, north.
nardt'-lich, northerly, toward the north.
nardt'-licht, aurora borealis.
nardt'-shain, aurora borealis.

närf, nerve; courage.
nâr'-haft, nutritious, power of sustaining.
nâr'-ish, crazy, insane.
nâr'-ish-kē'-da, foolishness, "tomfoolery."
n'âr'-yeds, nowhere, in no place; from *in* and *âr'-yets*.
nas, wet, moist.
nâs, nose.
nâs'-harn, rhinoceros.
nasht, branch of a tree.
nâs'-loch, nostril; *lit.*, nose hole.
nauⁿ, now.
na'-w'l, navel.
na'-w'l-bin, navel band, or bandage.
na'-w'l-bruch, umbilical rupture.
na'-w'l-shnür, umbilical cord.
nau'-ba, anything serious, or requiring delicate procedure or manipulation; difficulty of accomplishment, almost an equivalent of the common expression "no joking."
nē, neighborhood, vicinity.
neⁿ, no.
nē'-a, to sew.
nē'-ar, nearer; seldom used, the usual word being *ne'-ghār*.
nē'-arn, milliner, seamstress.
nē'-char, nearer.
nech'-ber-lich, neighborly.
nē'-dich, needy, necessary.
nēd'-lich, irritable, fault finding.
nē'-dich-a, to invite.
nē'-ghār, 1. nearer.
 2. negro.
ne'-gh'l-chiar, cloves; small nails; *lit.*, small nails.
nēgsh't, next, near, nearest.
nēksht, near, nearest, next.
nēm'-lich, namely; as follow; the same.
nem'-ma, to take, to select.
nem'-mar, a taker, or receiver.
nen'-na, to name, to suggest.

nē'-ra, to nourish.
nesht, nest.
nesht'-l-a, to nestle, to smuggle.
net, 1. not.
 2. neat, tidy.
net'-des'-d.i-wen'-ich-er, nevertheless
nēts, thread, sewing cotton.
nets, peritoneum.
nē'-wa, beside, aside of, on the side.
nē'-wa-bai, from another source ; by
 the side of ; from the side.
nē'-wa-drâⁿ, beside ; alongside of.
nē'-wa-gaul, the horse hitched to the
 right of the saddle horse.
nē'-wa-ge-bai'-er, out-buildings.
nē'-wa-här, alongside of ; from a
 side source.
nē'-wa-kosh'-ta, extra or incidental
 expenses.
nē'-wa-sach'-a, extra, things not es-
 sential.
nē'-wa-shtrōs, side street ; by-way.
ne'-w'l, fog, dew, mist.
ne'-w'l-a, to fall like mist ; to fall
 like drizzling rain.
ne'-w'l-ich, misty, foggy.
nē^a, never.
nē'-da, to rivet.
nē'-dar, down, low.
nē'-dar-drech-dich, contemptible.
nē'-dar-drech'-lich, contemptible,
 base.
nē'-dar-gshla'-gha, depressed, de-
 jected, stricken down.
nē'-dich-kēt, neatness.
niks, nothing.
niks'-nuts, good-for-nothing.
niks'-nuts-ich, worthless, bad.
niks'-wis-ser, know-nothing.
nim'-me, no more, no longer ; from
 the German *nicht mehr*.
nim'-mandt, no one.
nim'-mer, no more, no one.
nim'-mī, no longer, no more, not
 any more.
nē'-moldt, no one ; at no time.

nē'-mols, at no time, never.
nip'-pa, to nip, to pinch.
nār, kidney.
nā'-ra-fet, suet.
nā'-ra-graut, kidney-wort.
nā'-ra-knank'-et, kidney disease.
nā'-ra-shtik, the rump of veal.
nār'-insh-lich, suet ; *lit.*, kidney
 tallow.
nīs, 1. nits ; the eggs of lice or other
 small insects.
 2. nuts.
nā'-sa, to sneeze.
nish'-d'l-a, to nestle ; to smuggle.
nīs'-shis-ser, gad fly.
nīs'-sich, nitty ; having nits.
nā'-na-gh'l, rivet bolt.
nits'-lich, useful.
nī'-wer, across, over.
'n-nō', then, afterwards.
nō', after, then, afterwards.
noch, yet, still.
noch, after, toward.
noch'-a-mō'l, again, once more.
nōch'-bē'-da, to repeat a prayer after
 another.
noch'-ber, neighbor.
noch'-ber-lich, neighborly.
noch'-ber-shaft, neighborhood.
nōch'-brīng-a, to raise, to bring up.
noch'-dem, after this, hereafter ;
 afterwards.
nōch'-denk-ka, to consider, to reflect.
noch'-der-hand, afterwards.
noch'-en-an'-er, successive, succes-
 sively ; one after another.
nōch'-es'-sa, an after meal ; a sec-
 ond table ; to eat after the
 rest.
nōch'-frō-gha, to inquire ; to famil-
 iarize through inquiry.
nōch'-gä-bort, the placenta—after-
 birth.
nōch'-ge-wa, to yield.
nōch'-här, afterward, hereafter.
nōch'-hel-fa, to aid, to assist.

nōch'-kum-mes, descendants, descent.
nōch'-lēš-ich, careless, negligent.
nōch'-lēš-ich-kait, carelessness, negligence.
nōch'-los-sa, to relax, to abate.
nōch'-mit-dāk', afternoon.
nōch'-mōls, afterwards, again.
nōch'-richt, a bit of news, notice.
nōch'-rich-ta, news.
nōch'-ter-hand, afterwards, subsequently.
nōch'-wais, proof, explanation.
nōd'-glēch, open link.
nō'-d'l, a needle.
nōd'-'l, a bungler, a stupid fellow.
nōd'-tik, a "white lie;" a lie of necessity, or desire to avoid telling facts.
nōdt, 1. need, distress.
 2. seam.
nōd'-lai-da, to suffer want; to suffer loss or damages.
nōd'-lai-ta, to suffer damages; to be in want.
nōd'-wen-ich, necessary, needful.
nōd'-wen-ich-kait, need, necessity.
no-fem'-ber, November.
nō'-frō-gha, to inquire; to familiarize one's self by inquiry.
nō'-ge-wa, to yield, to give in.
nō'-hel-fa, to aid or assist.
nol, naught, cipher.
nō'-los-sa, to relax, to abate.
nō'-mach-a, to imitate, to counterfeit.
nom'-mi-dak, afternoon.
nō'-rē'-cha, to reach after, to attempt to reach after a thing.
nō'-rech-a, to rake, after the reaper.
nō'-sā-gha, to repeat after another.
nōt, a note, letter or bill.
nū'-d'l, noodle; dough rolled out flat and cut into thin strands, in imitation of macaroni, for soup.

nū'-d'l-svp, noodle soup.
nud'-sa, use, profit, service.
nuf, up, upward to a place or position.
nuf'-tsus, upwards.
nuk'-ka, to nod, to nudge.
num'-ma, only, but.
nūn'ar, down, downward; down from a place or position.
nun'-ar-tsus, downwards.
nup'-ba, to have important features, to be difficult of accomplishment; corruption of *nau'-bā*.
nur, only.
nuts, use, of service.
nut'-sa, of use, serviceable.
ob, whether.
ōbsht, fruit.
ōbsht'-bām, fruit tree.
och'-dem, breath.
od'-er, or.
ō'der, a vein; frequently applied to artery—*pols-ōder*.
ō'-der-a, to ooze from a wound, or the abraded skin.
ō' der-lō'-sā, to bleed—venesection.
od'-'r, or.
of'-en-bâr, manifest.
of'-fa, stove, oven.
of'-fa-rōr, stove-pipe.
of'-kōrs', certainly; corruption of English *of* and *course*.
of'n'-bâr'-iñg, revelation.
oft, often, frequently.
oks, ox, steer.
oks'-ich, brutal.
ōl, eel.
ō'laus-war'-tsel, elecampane.
ō'-lich, oil, oily.
ōr, ear.
ō'-ra-blē'-ser, tale bearer, tattler.
ōr'-faik, a box on the ear, a slap on the ear of another, with the flat hand.
ōs, carrion.

ōs'-hâ-na, turkey buzzard.
ōsh'-der-a, Easter.
ōsh'-der-âi, Easter egg.
ōsh'-der-blum, narcissus.
ō'-tem, breath.
o'-wer, whether he; corruption of
ob and *ēr*.
ō'-wet-rōdt, evening red—of sunset.
o'-w'r-den, loft in a barn.

pād, path, trail.
pad-si-ent', a patient.
paf, priest, preacher; not a polite
 appellation.
paif, 1. a pipe, a tube.
 2. a whistle.
pai'-fa, to whistle; to play the fife.
pai'-far, a piper, a whistler.
paül, an arrow.
pai'-lar, 1. a pier—of a bridge.
 2. a pillow (seldom used).
pain, torment, suffering.
pain'-ich-a, to torment, to worry,
 to distress.
pain'-lich, distressful, painful.
pak, 1. package, a bundle.
 2. a pack.
pa-lasht', palace.
pan, pan.
pan'-hâs, scrapple; a solid mass ob-
 tained by boiling buckwheat
 flour in the liquor resulting
 from boiling pudding (—liver
 sausage); *lit.*, pan rabbit.
pan'-na-kuch'-a, pan cake; pan
 cakes.
pât, path, trail.
pâr, pair, couple.
pâ'-ra, to pair, to match.
par'-a-bla, small-pox.
par'-a-bla-plan'-tsa, to vaccinate;
lit., to plant small-pox.
par'-ra, pastor, minister of the
 Gospel.
par'-ra-dīs, paradise.

par'-ras-kin-ner, catechumens; can-
 didates in preparation for
 joining the church.
pär-sēn'-lich, personal.
pär'-shüñg, peach.
ped'-'l, a boat oar.
ped'-'l-a, 1. to peddle, to hawk
 about.
 2. to row—as a boat.
ped'-'r, god-father.
pedts, in a quandary, in “a pinch,”
 in a tight place.
ped'-tsa, to pinch, to clamp.
pef'-fär, }
pef'-fer, } pepper.
pek, 1. a package.
 2. a peck—measure.
pen'-s'l, 1. a pencil.
 2. a paint brush.
pesh, a pest, a bother.
pesh'-blō'd'r, a carbuncle.
pesh'-tich-a, to annoy, to harass.
pē'-ter-lī, parsley.
pflech, foster.
pflicht, duty, obligation.
pflicht'-tich-a, to obligate.
pflicht'-ich-kait, duty, obligation.
pflicht'-lich, dutiful, obligatory.
pif, a whistle, a shrill whistling
 sound.
pik, 1. choice, selection.
 2. a pick or pick ax.
pik'-ka, to pick, to select.
pik'-tar, picture, an illustration.
pily'-rais, Pilgrim's progress.
pīn'-bō-ra, pegging awl.
pīng'-shta, Whitsun-tide.
pīngsht'-blum, lilac (flower).
pīngsht'-mân'-dāk, Whit-Monday.
pīngsht'-na-gh'l, pink (flower).
pink'-lich, punctual.
pinkt'-lich, punctual.
pīn'-na-gh'l, peg—used by cobblers.
pī'-rō, bureau.
pish-dōl', pistol, revolver.
pish'-per, a whisper.

pish'-per-a, to whisper.
pish'-bla, to whisper; to converse
 in an undertone.
pis'-sa-bet, dandelion.
plads, place, space, room.
plad'-shā, 1. to splash.
 2. to tattle or gossip.
pla'-nēt, planet.
plank, plank.
plan'sa, 1. to plant.
 2. pl. of *plans*, plant.
plap'-er-maul, a tattler, a "blab-
 ber," a gossip.
plash'-der-a, to plaster.
plash'-d'r, plaster.
plats, place, location, space.
plau'-der, conversation; the noise
 of voices in talking.
plau'-der-a, to converse, to talk.
pluu'-der-ich, talkative.
ple-sār', pleasure, enjoyment.
ple-sār'-lich, enjoyable, agreeable.
plok, 1. a plow.
 2. a log.
płök, 1. annoyance, toil.
 2. sickness.
plok'-ket, log chain; used in drag-
 ging logs.
plop'-per-ra, to babble, to tattle.
pi'ū'-gha, to plow.
pluk, a plow.
pluk'-gren-d'l, plow beam.
pluk'-shēr, plow share.
pod'-da, 1. to bud, to sprout.
 2. pl. of *pod* or *podt*.
pō'-hā-na, peacock.
pō'-hink'l, pea fowl (female).
pok, a pimple.
pōk'-bī-ra, poke berries, poke plant.
pok'-ich, pimpled.
pōk'-ich, slow, "poking."
pols'-ō-der, artery.
posh'-da, post, posts.
posht'-af-fis, post office.
posht'-mēsh-der, postmaster.
posht'-ta, post, posts.

pracht, splendor.
pracht'-fol, magnificent.
pral'-la, to boast, to brag.
pral'-lar, a braggart.
precht'-tich, excellent, splendid.
pred'-ich-a, to preach.
pred'-ich-amt, ministry; a charge.
pred'-ich-er, preacher, minister of
 the Gospel.
pres'-ent, prison.
pri'-gh'l, a club, cudgel.
pri'-gh'l-a, to club, to cudgel.
pri'-gh'l-hols, fire wood, consisting
 of heavy sticks.
pri'-gh'l-sup, a term used to denote
 a thrashing or clubbing in-
 flicted upon another.
pro'-fa-tsai'-a, to predict, to proph-
 esy, to foretell.
pro-fēt', prophet, a wiseacre.
pro-wī'-ra, to try, to attempt.
psa'-l'm, psalm.
psal'-t'r, psalter.
puđ'-l-hund, a poodle (—dog).
puł'-w'r, powder, gunpowder.
puł'-w'r-harn, powder horn.
pund, pound.
punk, punk, decayed wood.

ra'-cha, 1. mouth—applied to ani-
 mals; an opening like a
 mouth.
 2. revenge.
rach'-gēr-ish, avaricious, grasping.
rach'-ī-rish, vindictive.
rād, wheel.
ra-gūn', raccoon.
râi, a row.
raiⁿ, 1. clean, pure.
 2. in—toward the speaker or
 into an enclosure.
rai'-a, 1. to baste.
 2. to regret, to bemoan.
 3. the instep of the foot.
raib'-ai-sa, a grater.
rai'-blum, everlasting—flower.

- raich*, 1. rich, wealthy.
 2. kingdom, empire.
raich'-dūm, 1. riches, wealth.
 2. kingdom.
rai'-da, to ride—on horseback.
raif'-drau-wa, chicken grapes.
rai'-fa, frost.
raim, a rhyme, a ballad.
raim'-mä, 1. to agree with one another.
 2. to rhyme.
rai'-mī-dīch, repentant.
rain, pure, clean.
rai'-nich-a, to purify, to cleanse.
rai'-sa, 1. to tear, to sever by pulling
 2. to travel.
rais'-end, stirring, agitating.
rais'-hem-'l, that portion of a wagon on which the sliding piece moves.
rai'-wa, to rub, to chafe.
rai'-wai-sa, a grater.
rām, sash.
rām, cream.
rām'-lef'l, skimmer; *lit.*, cream spoon.
ran'-af, rim.
ran'-aft, rim.
ranft, rim.
rap'-'l-a, to rattle, to clatter.
rap'-'l-ich, rattling, dilapidated.
rār, rare, scarce.
rār'-ich-kēdt, rarity, scarcity.
rā'-sa, 1. to fume with rage.
 2. to play boisterously—as children.
rash, hasty, rash.
rash'-b'l, a rasp.
rap'b'l-a, to rattle, to rustle.
rash'-b'l-ich, rasping.
ras'-'m, rosin.
rat, rat.
rau, rough, coarse.
raub, a caterpillar.
rau'-bash'-tich, rough, ill-mannered, robust.
rau'bels', a coarse, rude fellow.
rau'-bi-gh'l, a coarse fellow.
raus, out of, out from.
raus'-fod-er-a, to challenge, to dare to come forward.
raus'-ge-wa, to give out, given out; to publish or issue.
raush, a spree.
rau'-sha, to rustle, to sound in a rushing manner.
râ-wa, to rob.
râ-wer, robber.
râ'-wer-ai, robbery.
re^{n'}, clean, pure.
reb, vine.
rē'-cha, to reach.
rech'-a, 1. a rake.
 2. to rake; to gather with a rake.
rech'-la, 1. to figure, to calculate.
 2. to reckon or imagine.
rech'-'l-buch, arithmetic—book.
rech'-lar, mathematician, reckoner.
rech'-liñg, reckoning, account.
rech'-niñg, an account, bill.
rech'-nuñg, account.
recht, right; correct.
recht'-färt'-ich-a, to justify.
recht'-mēs-ich, correctly, lawfully.
recht'-mēs-ich-ke^t, legality.
rechts, to the right.
recht'-shaf-fa, honest, upright.
recht'-shaf-ich, honest, virtuous.
re'-da, to speak or to address.
red'-ich, radish.
rēd-'l, red chalk.
rēd'-'l-a, measles.
red'-ner, speaker, orator.
red'-sa, to tease, to irritate.
redt, speech, oration, address.
rēf, hoop.
ref, rack; grain cradle.
ref-a-rī', an arbitration; referee.
ref'-a-rī'-man, arbitrator; referee.
rē'-fart, tansy.
ref'-fa, 1. to hoop or to bind with hoops.

rej'-shpros-sa, one of the upright bars, or rounds, of a rack.

rĕj'-shtek'-ka, hoop poles; *i. e.*, poles or rods used for making barrel hoops.

rĕ'-gha, to move, to urge.

re'-gha, rain.

re'-gha-fo-gh'l, cuckoo; *lit.*, rain bird.

re-gha-ment', regiment.

re'-gha-mes-ser, rain gauge.

re'-gha-rĕ, to rain.

re'-ghar-ich, rainy.

re'-gha-warm, earth worm; angle worm.

re-ghĕ'-ra, to rule, to govern.

re-ghĕ'-riĕng, government, rule.

re-ghish'-der, register, index.

rĕ'-gh'l, rule, regulation.

re'-gh'l-mĕ'-sich, regularly.

re'-gh'l-mĕ'-sich-kait, regularity.

re'l'-yĕn, religion.

ren'-na, to thrust, to push.

rĕr, tube, pipe.

rĕs, 1. a race—of speed.

2. a journey, tour.

3. race—for conducting water.

rĕ'-sa, to take a journey.

re-sĕ', receipt.

re'-sĕ'-ta, to receipt, to sign.

rĕsh'-da, to roast.

resh'-der, a patch—on shoes or boots.

resh'-ta, to arrest.

ret'-sa, to tease.

rĕts-'l, riddle.

re-tsept, receipt, recipe.

retsh'-a, to tattle.

retsh'-bet-ti, a tattle tale; one who hawks about news not intended for others.

retsh'-maul, a tattle tale.

rĕts-'l-a, 1. measles.

2. riddles.

ret'-ta, to save, to rescue.

rĕb, turnip.

rib, rib.

rĕ'-cha, to smell, to scent.

rĕch-ar, smellier, nose.

rich'-ta, to judge, to direct.

rich'-ter, judge; a director or guide.

rich'-tich, correct.

richt'-shaidt, a ten-foot pole, used by builders; carpenter's rule.

rid'-'l-a, 1. to agitate, to shake, to stir up.

2. small lumps of dough—made of flour, eggs, etc.—for boiling in milk for soup.

rid'-'l-sup, soup made of small fragments or lumps of dough boiled in milk.

ri'-gh'l, rail, bar; bolt.

ri'-gh'l-a, to bolt or bar.

ri'-gh'l-shlos, a bolt lock.

rik, back.

rik'-ka, to move, or budge.

rik'-shtraĕng, back bone, the spine.

rĕlps, an uncouth, ill-bred fellow.

rĕlps'-ich, ill-bred, uncouth.

rĕ'-ma, a strap or leathern thong.

rĕn, bark—as of trees.

rĕnd, heifer.

rĕĕng'-a, to place rings into hogs' snouts.

rĕĕng'-aus-shla'-gha, a game, commonly known as copenhagen; a kissing game.

rĕĕng'-'l, a ringlet.

rĕĕng'-'l-blum, marigold.

rĕn'-na, 1. to leak.

2. to bark.

rĕns'-fĕ, neat cattle; the rabble.

rĕns'-flĕsh, beef.

rĕns'-led-ter, calf-skin leather, leather for uppers.

rĕns'-tsuĕng, beef tongue.

rip, rib.

rip'-pa-fel, the pleura.

rip'-pa-shtōs, a nudge in the ribs.

rĕr'-ra, to stir.

rĕr'-end, stirring, exciting.

ris, 1. a crevice, a fissure.

2. a tear or rent.

riśh'bla, panicles.

riśh'-ar-ai', preparations.

riśht'-haus, an arsenal.

riśht'-ich, vigorous.

riśht'-ta, to prepare: to make preparations; to place in order.

riśht'-iñg, preparation.

rīs'-'l, snout.

rīs'-'l-but-ser, an insulting epithet; *lit.*, snout wiper.

rī'-wa, turnips; *rōdt*—beets=red-turnips; *göl*—carrots=yellow turnips.

rō, raw, sore.

rōd, 1. counsel, advice.

2. red.

rō'-da, 1. to guess.

2. to counsel, to advise.

rōd'-ge-w'r, counselor, adviser.

rōd'-sam, advisable.

rōdt, red.

rōdt'-hols, logwood (dye).

rōdt'-kop, 1. red-head.

2. red-headed woodpecker.

rōdt'-lich, reddish.

rōdt'-prin-se'-be-dât', red precipitate.

rōdt'-'r-hin-k'l-dârm, pimpernel.

rōdt'-rīb, beet; *lit.*, red turnip.

rōdt'-war'-tsel, blood root; *Sanguinaria canadensis*.

rok, coat.

rok'-flī-gh'l, coat tail, coat flap.

rol'-dū-wak, twist tobacco; plug tobacco.

rol'-la, to roll.

rop'-pa, to pull, to pluck.

rośht, rust.

rōr, tube, pipe, flue.

rōr'-blech, sheet iron.

ro-sain', raisin.

rośh'-da, to rust.

rōśhd'-grēt, gridiron; boiler.

rośhd'-ich, rusty.

rōśhd, a roast.

rośht', rust.

rośh'-ta, to rust, to oxidize.

rośh'-tich, rusty.

rots, secretion from the nose.

rots'-er, 1. an uncouth term to designate coryza.

2. an impudent child.

rots'-hols, slippery elm; *lit.*, "snot wood."

rots'-ich, "snotty," filthy from nasal discharge.

rōts'-lef-el, a vulgar epithet of contempt; applied to a mean, contemptible fellow.

rots'-nâs, a pert, impudent child; *lit.*, "snot nose."

rū, rest, tranquility, quiet.

ru'-der, rudder—of boat.

ru', up to a place.

rū'-fa, to call.

rū'-gha, to rest.

rū'-ich, quiet, tranquil.

rūk, rest, stop; quit.

rū'la, to rule, to govern.

rum, around, about.

rum'-a-dis, rheumatism.

rum'-a-dits, rheumatism (rare).

rum'-lē-fer, tramp.

rund, round.

rund'-iñg, roundness.

rund'-lich, roundish.

rund'-mē'-sel, gouge.

ruñg'-a-ni'-ra, to ruin, to destroy.

run'-na, standard (of a wagon).

run'-n'r, down, down to a place.

run'-s'l, a wrinkle.

runs'-lich, wrinkled, shriveled.

rūr, dysentery.

rūr'-graut, cudweed.

rūs, soot.

rūs'-ich, sooty.

rūt, 1. rod, a rood.

2. rod of thrashing flail.

rutsh, a slide, a coasting-hill.

rut'-sha, 1. to slide on one's seat.

2. to coast on a hillside—with sled.

rut'-shi, coasting-hill.

's, contraction of *es*—it, and generally sounded as *s*, without the initial short *e*.

sâⁿ, son.

sâⁿ'-ma, seed.

sach, thing.

sach'-ta, slowly, quietly.

sad'l, saddle.

sad'l-ar, saddler.

sad''l-gîrd, saddle girth.

sads, yeast.

saf'-ran, saffron.

saf't, sap, juice.

saf'-ta, quietly, stealthily.

safv'-ich, juicy.

safv'-lich, quietly, softly.

sâ'-gha, to say, to tell.

sâ'-ghas, a saying, a myth.

sai, 1. a sieve.

2. *pl.* of *sau*—hog.

saiⁿ, 1. to be.

2. his.

sai'-ar-ai', dirty work, a disgraceful result.

sai'-ar-lich, tart, acidified.

sai'-bârsh-ta, bristles, hog bristles.

sai'-bâr-tsel, 1. a "dirty villain," a scamp.

2. purslane.

sai'-bân, horse bean; *lit.*, hog bean.

sai'-ben, pig sty.

said, 1. page, side.

2. since; not as frequent as *tsait*.

sai'-da, silk, silken.

sai'-duch, straining cloth.

sai'-da-flesh, bacon; *lit.*, side meat.

sai'-fas, 1. swill barrel.

2. applied to a common drunkard.

sai' flesh, pork.

sai^f'-tser, a sigh.

sai^f'-tser-a, to sigh.

sai'-ish, "piggish," gluttonous.

sai'-ki-w'l, swill bucket.

sâ'-ma, 1. seed; growing grain.

2. to hem or stitch.

sârsh't, first, the first; contraction of *es ârsht*—the first.

sa'-tan, Satan.

sa-tâ'-nish, devilish, satanical.

sâ'-yer, a sawyer.

sail, a shoemaker's awl.

sai'-ô-ra-blât, plantain leaf; plantain stalk.

sai'-ô-ra-blet'-ter, plantain leaves.

sai'-shnüt-ter, a gelder—of hogs.

sai'-wa-ra, to cleanse.

sai'-war-lich, cleanly, neat.

sak, 1. a bag, a sack.

2. a pocket—in clothing.

sak'-dîb, pickpocket.

sak'-ra-ment', sacrament; used also as a curse.

sal-bê'-d'r, saltpetre.

sal'-dât, soldier.

sal-pê'-ter, saltpetre.

sals, 1. salt.

2. epsom salts.

sals'-baks, salt cellar.

sals'-flus, salt rheum.

sals'-lâk, brine, pickle.

sal'-waiⁿ, sage.

sal'-wen, selvedge.

sâⁿ'-ma-kop, seed pod.

sam'-la, to gather, to collect.

sam'-lîv'g, collection, gathering.

samsh'-dâk, Saturday.

samt, together with.

sand, sand.

sanft, mild, soft.

sanft'-mêd-ich, gentle.

sanft'-mât, gentleness.

sâns'-fra, daughter-in-law; *lit.*, son's wife.

sar'-ik-felt'-ich, solicitous, careful.

sar'-ik-lôs, careless.

sar'-ik-sam, careful.

sart, sort, kind.

sar'-ya, 1. cares, trouble.

2. to provide, to care for.

sar'-ya-frai, free from care.

sas'-sa-fras', sassafras.

sas-sa-fril', sarsaparilla.

sat, satisfied, gratified.

sats, yeast.

sau, a sow, pig, hog.

sau'-a, to besmear, to daub.

sau'-ar, sour, acidulous.

sau'-er-dēk, leaven, leavened dough.

sau'-er-graut, sourkraut. Cabbage cut into shreds—slaw—and packed in salt to form pickle or brine. It is then boiled and served. Frequently salt meat, or sausage, is boiled with it.

sau'-er-kraut, sourkraut.

sau'-er-ramb'l, sorrel—a plant.

sau'-fa, 1. to drink—animals.

2. to drink to excess—drunkard.

sau'-fer-ai, a spree, a drunken frolic.

sau'-gich-ter-a, delirium tremens.

sau'-fō-d'l, a professional drunkard, a drunken loafer.

sau'-wer, clean, pure.

sē, sea, ocean.

se'-a, 1. to sow.

2. to see, to look (not common).

se'-ar, a sower, a planter.

sech, coulter.

sēd, string, string of instrument.

seds, clinch iron.

sēf, soap; *shmār sēf*—soft soap; *sēf was'-ser*—soap suds.

sēg, a saw.

sē'-gha, to saw.

sēg'-bok, saw buck, "saw horse."

sēg'-mēl, saw dust.

sēg'-mīl, saw mill.

sēg'-rich'-ter, saw-rest; *lit.*, saw guide.

se-gunt', a second—of time.

seks, six.

sek'-sa, six.

sekst, sixth.

sel, that (before neuter gender, and occasionally feminine).

sēl, 1. soul.

2. a wisp of straw for tying a sheaf.

sel'-a-mol, at that time, then.

sel'-a-mols, in those times, then; at that time.

sel'-ar, that (before masculine substantive).

sel'-ar-ich, celery.

sēl'-ich, blessed, holy.

sēl'-ich-kait, salvation, state of blessedness.

sēl'-ich-kēd, salvation; condition of blessedness.

sel'-li, that (before substantive fem. or pl. of any gender).

selbst'-mard, suicide.

sel'-da, seldom, rarely.

sel'-wen, selvedge.

sel'-wer, self.

sem'-li, assembly—Legislature of a State.

sem'-li-man, assemblyman—member of State Legislature.

sēn'-na, to see, to look, to behold.

sen'-et, senate.

senk'-l, plummet.

sens, scythe.

ses'-r, assessor.

ses'-ment, assessment.

set, should.

sēt, the season for sowing cereals.

set'-sa, to seat, to seat one's self, to place.

se'-warsh't, the upper; from *dēs* and *e'-warsh't*.

shâb, moth.

shâ'-bok, scurvy.

shâd, a pity.

sha'-da, shadow, shade.

- shâ'-da*, injury, damage, loss.
shad'-da, shadow.
shâd'-lôs, free of harm.
shâd'-lôs-band, indemnity bond.
shaf'-fa, to work.
shaf'-ich, industrious.
shâiⁿ, shine, sign.
shai'-a, to scare, to frighten.
shai'-ar, barn.
shai'-ar-den, barn floor, upon which
 threshing was formerly done.
shâib, 1. target—for shooting.
 2. pane—of glass for window.
shâiⁿ'-hai-lich, hypocritical, false.
shai'-led'-ter, blinker—of horse har-
 ness.
shain, shine, to appear.
shâiⁿ'-na, 1. to shine, to glisten.
 2. to appear.
shal, sound, echo.
shâl, 1. shell, rind.
 2. shawl.
shâ'-la-wök', balance.
shalk'-yör, leap year.
shal'-la, to echo, to sound.
shal'-lach, scarlet.
shal'-lach-fris'l, scarlet rash.
shal'-lak, a wag, a scamp.
shâm, froth, scum.
shâm'-lef'l, skimming spoon.
shand, shame.
shand'-bâr, shameful.
shand'-bâr'-lich, shamefully.
shank, closet, cupboard.
shap, shop, work room.
shâr', scissors, shears.
shâr, plow-share.
sharf, sharp.
shar'-a-fa, to sharpen.
shar'-a-wa, 1. fragment of pottery;
 pieces of pots.
 2. shale or shaly formation.
shâr'-bok, scurvy.
shâr'-fa, to sharpen.
sharn'-shda, chimney.
sharn'-shda-but'-ser, chimney sweep
shâr'-ra, to cut with scissors, to
 shear.
sharts, apron.
shärts, apron.
shärts'-fel, leather apron.
shats, sweetheart.
shat'-tä, shade, shadow.
shat'-tich, shady.
shau'-der-a, to shudder.
shau'-der-ich, shuddering, terrible,
 agonizing.
shau'-der-haft, terrible, agonizing.
shau'-fel, shovel.
shau'-f'l, a shovel.
shau'-f'l-a, to shovel.
shau'-f'l-ök', cultivator.
shâ'-wa, 1. to scrape, to shave.
 2. *pl.* of *shâb*, moth.
shbâ'-da, spavin.
shbaich'-er, the second—or upper-
 story.
shbait, spite.
shbank, pluck, "spunk," temper.
shban'-na, to span, to stretch.
shban'-pet, cross beam.
shbâr, a brake.
shbâr'-a-gräs, asparagus.
shbâr'-it, spirit, spirits.
shbâr'-ket, brake chain; log chain.
shbâr'-lich, scarce.
shbar'-liñg, sparrow.
shbâr'-ra, to put on brakes, to lock.
shbar'-ra, rafters.
shbâr'-ra, to save, to spare.
shbas, sport, play; generally term-
 ed *kshpas*.
shbâr'-sam, economical, saving.
shbâr'-w-la, persimmons.
shbat'-sî'-ra, to promenade; to go
 visiting or calling.
shbau'-a, to spit.
shbau'-baks, spittoon.
shbauds, saliva.
shbēⁿ, chips.
shbed'-la, to mock.
shbed'-lich, mockingly.

shbek, bacon, fat ; adipose tissue.
shbek-dâ'-gh'l, spectacle, a sight.
shbek-dâ'f', a spy glass ; small telescope.
shbek'-drau-wa, fox grapes.
shbek'-maus, bat—*vespertilio*.
shbek'-shwârt, a piece of bacon used to grease a griddle, in baking batter cakes.
shbel, pin.
shbel'-la, to pin.
shpeñg'-lar, tinker.
shbets'-l, sparrow ; generic term for *fringillidæ*.
shbi-ân', a spy.
shbi'-gh'l, mirror.
shbi'-la, 1. to play.
 2. to rinse.
shbi'-lar, a player ; a gambler.
shbił'-sach, toys—play things.
shbił'-shis'l, dish pan.
shpîł'-was'-ser, dish water.
shbin, spider.
shbin'-d'l, pivot ; spindle.
shbin'-na, 1. to spin.
 2. *pl.* of *shbin*.
shbin'-na-râd', spinning wheel.
shbin-nât', spinach.
shbin'-na-wôb', cobweb.
shbîs, spear.
shbit'-sa, 1. to point, to sharpen to a point.
 2. a point, apex.
shbit'-sich, pointed, acute.
shbit' ta, to split.
shbô'-ra, spur.
shbot, derision, mockery.
shbôt, late.
shbot'-nâ-ma, nickname.
shbot'-ta, to mock, to scorn.
shbôt'-yôr, autumn.
shbrad'-lich, spread out.
shbrau, chaff.
shbrau'-sak, chaff-bag, used on beds.
shbrauts, sprout, sucker, a shoot.

shbraut'-ta, to sprout ; to throw off new branches.
shbrê'-a, to spread ; to spray.
shbrech'-ä, to speak, to talk.
shbreñg'-a, to run, to force to speed.
shbrî, a spree, merry-making ; a frolic.
shbrî'-a, to spree ; to become intoxicated.
shbrich'-ward, proverb, by-word.
shbrika, sprigs, brads.
shbrîñg, a spring ; spring—of water.
shbrîñg'-a, to run.
shbrîñg'-shtok, spring lancet, used in venesection.
shbrîts, a syringe.
shbrîł'-sa, 1. to squirt, to sprinkle.
 2. to water—with a hose.
shbrôch, speech, language.
shbrod'-lich, spread out.
shbroš'-sa, rounds—of bannisters, etc.
shbruch, scriptural text, biblical quotation.
shbruñg, a leap, a spring.
shbruñg'-rî-ma, martingale—of harness.
shbuk, ghost, apparition, "spook ;" commonly termed *kshpuk*.
shbuk'-ka, to spook ; manifestation of ghosts or apparitions ; to haunt.
shpûl, spool.
shbund, bung.
shbund'-bô'-ra, gauge.
shbunk'-ich, plucky, tempered.
shbür, track, foot-prints.
shdâb, dust.
shdach'-l, a spine, sharp point, a prickly point.
shdâch'-l-ich, prickly.
shdaif, stiff.
shdaif'-iñg, buckram.
shdaif'-ket, stay chain.
shdaik'-bi-gh'l, stirrup.
shdai'-gha, to ascend, to go up.
shdal, stable, stall.

shdâl, steel.
shdam, branch, stem.
shdam'pa, to stamp, to tread heavily.
shdand, state, condition.
shdand'-haft, steady, steadfast.
shdañg, pole, rod.
shdâr, blackbird.
shdâr'-a-wa, to die, to expire.
shdâr'-a-wes-krank, mortally ill.
shdärb'-lich, mortal.
shdärb'-lich-kait, mortality.
shdâr'-ik, 1. strength.
 2. starch.
shdâr'-ik-a, to starch, to stiffen with starch.
shdärk, strength.
shdar'-kep'-pich, stubborn, obstinate
shdarm, storm.
shdarm'-ich, stormy, boisterous.
shdarm'-wind, tempest.
shdärn, 1. forehead.
 2. star.
shdärn'-blum, aster; *lit.*, star flower.
shdärn'-hel, unclouded; *lit.*, star clear.
shdär'-na-hel, clear, unclouded.
shdär'-na-ken'-er, astronomer.
shdärns, confounded, confoundedly.
shdärt'-sa, to tumble, to fall.
shdat, city.
shdât, state.
shdâ'-wa, to dust, to be dusty.
shdê, 1. to stand.
 2. stone.
shdê^{an}. *bok*, Capricorn.
shdê^{an}-*bō-ra*, drill, used in quarrying
shdê^{an}-*bruch*, quarry.
shdech'-a, to stick with a sharp instrument; to stab.
shdech'-ab'-l, thorn apple, fruit of jimson weed — *Stramonium datura*.
shdêk, 1. stairs.
 2. a foot-bridge across a stream, a tree trunk being the ordinary kind.

shdêk'-drep-pa, stair steps.
shdek'-ka, 1. stick, sticks, cane.
 2. to stick, to place, to put down.
shdek'ka-bâ-na, pole beans.
shdê^{an}-*klê'-a*, trefoil.
shdek'-l-lä, to play hide and seek.
shdel, 1. a place, an office.
 2. *pl.* of *shdal*, stable.
shdê'-la, to steal, to rob.
shdê'-lar, thief.
shdel'-la, to place, or to put; to stand up anything.
shdels, stilt.
shden'-ner, a large tub.
shdêñg'-l, a stalk, a stem.
shdêñg'-l-gläs, wine glass.
shdep'-pa, to stitch, to quilt.
shdet'l, village; *lit.*, little city.
shdib'-cha, a small room.
shdich, a stitch, a sting, a sudden pain.
shdich'-la, to hint.
shdids, a small wooden bucket, having a lid; used for carrying water to the fields for workmen during harvest time.
shdijf'-br-ü'-der, step-brother.
shdijf'-fad'-ter, step-father.
shdijf'-mut'-ter, step-mother.
shdijf'-shwesh'-ter, step-sister.
shdik, a piece.
shdik'-stus, croup.
shdik'-l, 1. a stake.
 2. a small piece.
shdik'-l-a, to patch; to do patch-work.
shdik'-l-dep'-pich, a patch quilt—"crazy quilt."
shdik'-l-fens, stake fence.
shdil, 1. a still, a retort for distilling purposes.
 2. quiet, silent.
shdül, handle.
shdül'-er-i, distillery.

shdīl'-la, to quiet, to soothe.
shdīl'-shdand, stagnation.
shdīl'-shwai-gha, to silence, to beckon, to be silent.
shdim, 1. voice.
 2. a vote, a ballot.
shdīm, steam.
shdim'-ma, 1. to vote, to take a ballot.
 2. to tune—as an instrument.
shdīm'-ma, to steam.
shdim'-p'l, a small surplus.
shdīnk, stench, bad smell.
shdīnk'-bok, a stinking fellow; sometimes applied to old toppers.
shdīnk'-ka, to smell badly, to stink.
shdīnk'-kēs, hand cheese; also applied to Swiss and Limburg cheese.
shdī'-w'l, boot, boots.
shdī'-w'l-ä, to tramp, to walk.
shdī'-w'l-hols, boot tree—used by cobblers.
shdī'-w'l-knecht, boot-jack.
shdob'-ba, 1. to darn.
 2. to stop, to quit.
shdod'-der-ra, to stammer.
shdo'-di-a, 1. to meditate, to study.
 2. to steady, to make secure.
shdoft, stuff. Generally applied to lumber boards, etc., for builders' use.
shdok, 1. cane, stick.
 2. a stack—as hay or straw.
shdok'-blindt, totally blind.
shdok'-bâ-na, bush beans.
shdok'-dâb, totally deaf, "stone deaf."
shdol'-ba-ra, to stumble.
shdol'-fūs, club foot.
shdol'-la, balls of snow which form on horses' hoofs.
shdols, proud, vain.
shdop'-p'r, a stopper, cork.
shdōs, a thrust, a push.
shdō'-sa, to push, to thrust; to ram.

shdōs'-wâi, chicken hawk.
shdraich'-a, to stroke, to smooth.
shdrai'-da, to quarrel, to live at enmity with one another.
shdraid'-ich, quarrelsome.
shdrai' s'l, a nosegay, a small bouquet.
shdrait, strife, disorder, quarrel.
shdraks, immediately, without delay.
shdrâl, streak, ray, beam.
shdrâl'-ich, rayed, streaked.
shdrâm, stream, current.
shdram'-bla, to trample.
shdrañg, 1. trace.
 2. skein.
shdra'-w'l-a, to struggle, to kick.
shdra'-w'l-ar, a struggler. A term applied to a sect of Methodists.
shdrē'-a, to strew, to spread, to make a litter.
shdrēch, a stroke, a blow.
shdrē'-fa, strip, stroke.
shdrēf'-ich, striped, streaked.
shdrēk'-ka, to stretch.
shdrēl, comb.
shdrē'-la, to comb.
shdrēm'-ich, streaked, banded.
shdrich'-a, 1. a stroke or line.
 2. teats of a cow.
shdrids, a syringe.
shdrīd'-sa, to squirt with a syringe.
shdrī'-gh'l, currycomb.
shdrī'-gh'l-a, to curry.
shdrīk, rope.
shdrīk'-gärn, yarn, knitting yarn.
shdrīk'-ka, to knit.
shdrīp'-pa, to strip, to undress.
shdrīp'-hüt, a woman's head gear in imitation of a bonnet, resembling the so-called scoop, but made of calico or print goods to permit of washing and ironing.
shdrō, straw.

shdrō'-bank, straw cutter.
shdrōf, punishment.
shdrōf'-fa, to punish.
shdrō'-fak'-l, a bundle of straw.
shdrō'-kis'-sa, straw bolster.
shdrō'-kne'-w'l, a short piece of wood used for tying wisps of straw around a bundle of straw or a sheaf.
shdrōs, street, road.
shdrō'-sak, straw mattress, straw bed.
shdrump, stocking, sock.
shdrump'-bend'l, garter; *lit.*, stocking string.
shdrup, hames hook.
shdrup'-nō-d'l, bodkin.
shdrū'-w'l-ich, 1. disheveled.
 2. ungovernable, obstinate.
shdub, room, apartment.
shdu-dent', student.
shdu-dī'-ra, to study.
shdūl, chair.
shdūl'-gañg, defecation, excrement.
shdum, mute, dumb.
shdump'-pa, a stump.
shdump'-shwans, bob-tail, bob-tailed horse.
shdun, hour.
shē^o, nice, pretty.
shēb, crooked, out of place.
shēd, sheath.
shē'-da, to divorce.
shē'-d'l, 1. scalp.
 2. part in the hair.
 3. skull.
shēd'-lich, dangerous.
shed'-sā, to appraise.
shēd'-was-ser, sulphuric acid.
shē'-fer, pawnbroker; corruption of *Eng.* shaver.
shē'-fer-shap, pawnbroker's shop; sometimes applied to brokers' establishments where questionable transactions are practiced.

shēk'-ich, spotted, dappled, variegated.
shēl, one-eyed; blind of one eye.
shē'-la, to pare, to peel.
shēl'-a-grant, celandine.
shēl'-cha, saucer; *lit.*, a little shell.
shēl'-da, to scold.
shēl'-maul, a scold, a vixen.
shēl'-liks, a wild, mischievous fellow.
shēlm, a rogue.
shēm'-ma, to blush; to be ashamed.
shenk'-ar, a donor, a giver.
shenk-gā'-shī, a gift, a present.
shenk'-ka, to present, to give, to give as a present.
shenk'-l, a thigh, a leg.
shēp, crooked, leaning.
shēp, 1. sheaf.
 2. shape, form.
shēp'-bōl, dipper.
shēpf'-iñg, creation.
shēpf'-uñg, creation.
shēp'-ki-w'l, a small bucket for dipping or bailing.
shēp'-tef'-l, ladle.
shēp'-pa, to dip, to bail—as water.
shēr, 1. shears, scissors.
 2. share, part.
shē'-ra, 1. to cut with shears or scissors.
 2. to divide, to share.
shīb, spade, scoop.
shīb'-ba, 1. dandruff, scales.
 2. frowns, as when a child begins to cry.
 3. *pl.* of *shīb*, spades.
shīb'-fensh-ter, sash window.
shid'-l-a, to shake, to agitate.
shid'-l-ar, shaker—in thrashing.
shid'-l-ga-w'l, a wooden fork for use in and about the barn.
shids, a marksman.
shif, ship.
shif'-l, shuttle.
shif'-f'l, a shuttle.

shij' - lait, ship's crew, sailors.

shik' - ka, to send, to forward.

shik' - lich, suitable ; handy.

shik' - sâl, fate.

shild, 1. sign.

2. shield.

shild' - grot, tortoise.

shild' - posh' - ta, sign post.

shild' - shaid, swingle-tree.

shil' - shaid, single-tree.

shim' - mel, a white horse.

shim' - m' - r - a, to glisten, to shimmer, to shine.

shimp, disgrace, shame.

shimp' - pa, to disgrace, to shame, to abuse.

shü' - na, splints, of wood, particularly of hickory, for manufacture of brooms, baskets, etc.

shü' - na - bö' - s' m, splint broom.

shü' - na - karb, splint basket.

shin' - bēⁿ, shin, leg.

shin' - d' l, shingle.

shin' - lū - d' r, a scamp, a rascal.

shin' - na, 1. to flay, to abrade.

2. to overwork.

shin' - ner, 1. a skinner ; a term applied to a scavenger.

2. one who overworks servants.

shan' - nōs, carrion, a "dirty villain."

ship, shovel.

shir, nearly, almost.

shü' - sa, 1. to shoot.

2. to sprout, or run to seed.

shü' - ser, a flat wooden shovel used in putting bread into the oven.

shäs' - ga - wēr', fowling piece, firearm.

shis' - 'l, dish.

shi' - w' l, a clod, a lump.

shi' - w' r, piece of shale, or slate, fragment of pottery.

shi' - w' r - ich, 1. speckled, spotted, spangled.

2. shaly, slaty.

shü' - wa, to shove, to push.

shü' - wer, a drawer.

shü' - wer - li, trundle bed.

shkū' - da, to skate.

shkūdt, skate.

shkwärl, squirrel.

shlacht, slaughter, battle.

shlach' - ta, to butcher, to kill.

shlach' - f' v', cattle, fattened for killing.

shla' - gha, to strike, to beat.

shlaich' - a, to sneak along ; to go forward cautiously.

shlai' - fa, 1. to grind, to sharpen.

2. to slide.

shlaij' - shdēⁿ, grindstone.

shlaim, slime ; mucus.

shlak, 1. a stroke, a blow.

2. apoplexy.

shlam, slime, ooze.

shlāñg, snake.

shlap, swill, slop.

shlap' - hüt, sunbonnet.

shlap' - pich, sloppy, untidy, muddy.

shlar - af' - fa - ksicht, false face, mask.

shlau, cunning.

shla' - w' r - a, to slobber.

shla' - w' r - duch, bib ; *lit.*, slobber cloth.

shlecht, bad ; poorly.

shlecht' - ich - kēd, villainy, badness.

shlēt, slate.

shlēt' - dek - ar, slater ; one who roofs with slate.

shlēt' - fer - ich, sleepy.

shlēt' - fa, to drag, to pull.

shlēt' - gâr n, seine—a net.

shlēt' - 'r - ich, sleepy.

shlēt' - gh' l, a sledge.

shlek' - er - ai', dainties.

shlek' - er - wē' - sa, dainties, sweets.

shlek' - ka, to lick.

shlek' - sach, dainties.

shlenk, 1. a sling.

2. thumb latch.

shlenk'-er-ich, loose jointed, rickety.

shlichl'-ho-w'l, smoothing plane.

shlids, slit, crevice.

shlid'-sa, to slit, to cut in slits.

shlid'-ta, sleigh, sled.

shlik, quick, crafty.

shlik'-ser, hiccough.

shlim, bad, sad, pitiable.

shliñg, hot punch.

shlip'-pa, 1. to slip, to slide.

2. to catch with a slip-noose.

shlip'-per-ich, slippery.

shlip'-pers, 1. slippers.

2. sleepers—railroad ties.

shlā'-sa, to lock, to close.

shlās'-blum, primrose.

shlās'-lich, in conclusion.

shlās'-s'l, key.

shlās'-s'l-blāt, key-hole plate.

shlits, slit, crevice.

shlüt'-ta, sleigh, sled.

shlüt'-ta-lē'-fer, sleigh runners.

shli'-w'r, splinter, fragment.

shli'-w'r a, 1. to splinter, to shatter.

2. pl. of *shli'-w'r*.

shlōf, sleep.

shlō'-fu, to sleep.

shlōf'-kam mer, sleeping chamber,
bed room.

shlōf'-shtub, sleeping room.

shlos, lock.

shlös, hailstone.

shlō'-sa, 1. to hail.

2. pl. of *shlös*.

shluk, a swallow or gulp.

shluk'-ka, to swallow, to gulp.

shlum'-pich, slovenly.

shlup, noose, loop, bow.

shlup'-pa, to crawl, to hide; to
slip.

shlus, end, conclusion.

shlut'-ser, sugar teat.

shmai'-sa, to throw.

shmak, taste.

shmak'-er, a smack, a kiss, one who
tastes.

shmak'-ka, to taste; to detect.

shmäl, small, narrow.

shmā'-ler, a drink of liquor.

shmals, lard.

shmärd, smart, obedient, diligent.

shmär'-tsa, pain.

shmat'-sa, to smack the lips.

shmëch'-l-a, to flatter, to fondle.

shmel'-sa, to melt, to thaw.

shmëch'-lich, flattering, insinuating,
ingratiating.

shmēs'-mik, blue-bottle fly.

shmid, blacksmith.

shmid'-tsar'-i-k'l, calipers.

shmär, grease.

shmär'-kēs, cottage cheese; *lit.*,
spread cheese, *i.e.*, cheese that
may be spread on bread, the
usual manner of eating. In
rural districts, a layer of ap-
ple-butter is also spread on
the bread.

shmär'-ra, to grease, to besmear.

shmär'-sēf, soft soap; *lit.*, spread
soap, or soap that may be ap-
plied by spreading.

shmod'-ich, sultry.

shmök, smoke.

shmō'-ka, to smoke.

shmök'-du-wak', smoking tobacco.

shmun'-ts'l-a, to smile.

shmunst'-lich, smiling; ingratiating.

shmutz, grease, dirt.

shmutz'-ich, greasy, filthy.

shnaid, cutting edge.

shnai'-da, to cut.

shnaid'-bank, bench used by coopers
for cutting wood with a draw
knife.

shnai'-der, 1. tailor.

2. grand-daddy long-legs; in-
sects of the family *phalangi-*
dæ.

shnai'-dern, dressmaker.

- shnaid'-mes-ser*, draw knife, used by coopers and carpenters.
- shnaid'-sa*, to blow the nose, by using the fingers for pressure on the *alæ*.
- shnal*, buckle.
- shnal'-la*, 1. to buckle.
2. *pl.* of *shnal*.
- shnap'-pa*, to snap.
- shnaps*, liquor, a dram—drink.
- shnap'-sak*, knapsack.
- shnär'-fo-gh'l*, humming bird; *lit.*, jerk (jerking) bird, on account of its sudden and erratic movements.
- shnar'-ik-sa*, to snore.
- shnar'-ra*, to hum.
- shnär'-ra*, to jerk.
- shnau'-fa*, to breathe.
- shnë*, snow.
- shnë'-a*, to snow.
- shnë'-ich*, snowy.
- shnë'-flok-ka*, snow-flakes.
- shnek*, snail.
- shnek'-ka-shtök*, winding stairway.
- shnë'-kshti-w'r*, snow storm.
- shnel*, quick, hasty.
- shnel'-ler*, carnivorous beetle, found on hams.
- shnel'-wök*, steelyard—scale.
- shnep*, a snipe.
- shnep'-pa*, 1. to tilt, to lift with a lever
2. snipes; *pl.* of *shnep*.
- shnep'-per*, 1. snapping turtle.
2. trigger of a gun.
- shnë'-shti-w'r*, snow storm, a flurry of snow.
- shnik*, a sneak.
- shni'-ka*, to sneak.
- shnik'-ich*, sneaky.
- shnip'-sa*, to sob, to sniffle.
- shnit*, a cut; cutting of a plant.
- shnits*, dried fruit, cut in small slices, as quarters or eighths; usually applied to sliced dried apples.
- shnit'-sa*, 1. to fib, to evade the truth.
2. to cut fruit into quarters and eighths, for drying, *i. e.*, to slice.
- shnits'-l-a*, to whittle, to cut with a knife.
- shöf'-not'-l'l*, black haw, and fruit.
- shöf'-rib'-ba*, yarrow—plant.
- shop*, shed.
- shös*, lap.
- shnök*, gnat.
- shnot'-er-a*, to cackle.
- shnub'-ba-ra*, to meddle, or trifle, with things belonging to others.
- shnub'-duch*, handkerchief; *lit.*, snuff cloth.
- shnuf'-l-a*, to sniffle, to meddle and search out things belonging to others.
- shnup'-du-wak'*, snuff; *lit.*, snuff tobacco.
- shnup'-pa*, 1. coryza; snuff.
2. to snuff, to sniffle.
- shnür*, cord, twine, string.
- shnur'-bârt*, mustache.
- shnüt*, snout, muzzle, nose.
- shö'-da*, pods.
- shö'-da-bâm*, catalpa tree.
- shöf*, sheep.
- shöf'-bok*, ram.
- shöf'-flësh*, mutton.
- shok'-l*, cradle.
- shok'-l-a*, to rock, as a cradle or chair.
- shok'-l-shtül*, rocking chair.
- shpâd*, spade.
- shpär'-ket*, a chain used to secure a wheel from revolving so as to act as a brake.
- shpär'-ra*, to bar.
- shpau'-a*, to spit.
- shpauts*, spittle, saliva.
- shpauts'-sa*, to spit.
- shpëⁿ*, chips.

- shpēcht*, 1. flicker—*Colaptes auratus*;
usually known as *gēl shpēcht*.
2. spoke—of a wheel.
- shpīcht' -ta*, amusing stories; the
usual form, as pronounced, is
kshpīcht' -ta.
- shpīl*, object, plan, conception.
- shpāl' -lum-pa*, dish rag.
- shpits' -bū*, a rascal, a keen fellow.
- shpīt' -sa*, 1. a point, apex.
2. to point, or to cut to a point.
- shpits' -ich*, 1. pointed, sharp.
2. acute, wide-awake, shrewd.
- shpits' -ōr-ich*, keen; *lit.*, sharp-
eared.
- shpot*, mockery.
- shpōt*, late.
- shpot' -ta*, to mock, to make fun of.
- shpōt' -yōr*, autumn.
- shpot' -fo-gh' l*, mocking bird.
- shprat' -s' l-a*, to sputter, sputtering
—as boiling mush.
- shpūr*, path, track, trace, trail.
- shpūr' -ra*, to track, to trail, tracks.
- shrain' -er*, carpenter.
- shrai' -wa*, to write.
- shrai' -wes*, a writing, an agreement,
a legal instrument.
- shrank' -lich*, shaky, unsteady.
- shraub*, screw.
- shraub' -shtok*, 1. a vice.
2. gunrod with screw attached.
- shrau' -wa*, 1. to screw.
2. *pl.* of *shraub*, screw.
- shrau' -wa-tōv' -gher*, screw driver;
lit., screw drawer (or puller).
- shrek' -lich*, terrible, frightful.
- shrep' -kop*, cup, for blood-letting.
- shrep' -pa*, to cup, to let blood by
scarifying.
- shrīf*, sheriff.
- shrī' -fa*, to sue—at law.
- shrift*, 1. Scriptures.
2. writing, script.
- shrift' -lich*, in writing
- shrit*, a step.
- shrit' -ta*, to step.
- shrit' -wais*, by steps, step by step.
- shrōt*, 1. shot—for bird shooting.
2. chop—for fodder.
- shrōt' -sak*, shot bag, or pouch.
- shrōt' -mē' s' l*, chisel hammer.
- shā' -wich*, dusty.
- shētē*, 1. to stand.
2. stone, stones.
- shēm' -p' l*, a pestle, a masher.
- shen' -da*, to stand, to bear.
- shētēⁿ -ē-sel*, jackass.
- shētēⁿ -of-fa*, lime kiln; *lit.*, stone
kiln.
- shtrēng*, 1. severe, strict.
2. *pl.* of *shtrāng*, trace, or skein.
- shtud' -sa*, to hesitate.
- shu*, Shoo! An exclamation to drive
away anything, like fowl,
etc.
- shū*, shoe.
- shū' -a*, to shoe a horse.
- shū' -bud' s' r*, door mat.
- shū' -flik-er*, cobbler.
- shūl*, school.
- shū' -lar*, scholar.
- shuld*, 1. debt.
2. guilt, crime.
3. cause.
- shul' -da*, debts.
- shuld' -ner*, debtor.
- shūl' -iñg*, education.
- shūl' -kum' r-rād'*, schoolmate, school
comrade.
- shul' -ter*, shoulder.
- shul' -tich*, owing, obligatory, to
owe another.
- shū' -mach-er*, shoemaker.
- shū' -mek*, sumach.
- shun*, already, so soon.
- shu' -na*, favor.
- shuñg' -ka*, ham, hip.
- shunsht*, otherwise, else.
- shup' -karch*, wheelbarrow.
- shup' -kar-ich*, wheelbarrow.
- shup' -blāt*, drawer.

shus, 1. shot.
 2. sprout.
shus'-blö-t'r, styè.
shus'-börd, tail board.
shwäär, 1. father-in-law.
 2. heavy.
shwäär'-lich, hardly.
shwää'-ra, a boil; more commonly known as *kshwää'-ra*.
shwach, weak.
shwach'-hët, debility, weakness.
shrai, sister-in-law.
shwalm, swallow, martin, swift.
shwam, 1. meadow.
 2. sponge.
 3. tumor, as *blüt shwam*—blood sponge—signifying a *fungus hæmatodes*.
shwân, swan.
shwan'-hä'-gh'l, swan shot.
shwans, tail.
shwans'-rim, crupper.
shwans'-ri'-ma, crupper.
shwärm, swarm.
shwär'-ma, to swarm.
shwärt, 1. rind of bacon.
 2. the board cut from a log in squaring, with the bark adhering.
shwarts, black.
shwart'-ser, negro; i. e., a black one.
shwö'-ghern, sister-in-law.
shwöng'-k'l, pump handle.
shwenk'-ka, 1. to rinse.
 2. to wave.
shwen'-s'l-a, to wag the tail; to wag.
shwör, heavy.
shwö'-ra, to swear.
shwös, perspiration, sweat.
shwesh'-der, sister.
shwes'saa, to weld.
shwös'-lech-er, pores—of the skin.
shwet'-sa, to talk, to converse.
shwet'-sar, speaker, orator.
shwet'-sich, talkative.

shwöl'-w'l, sulphur.
shwöl'-w'l-blöd, flour of sulphur.
shwö'-ghern, mother-in-law.
shwö'-gher-doch'-ter, daughter-in-law.
shwö'-gher-fad'-ter, father-in-law.
shwö'-gher-mut'-ter, mother-in-law.
shwö'-gher-sâⁿ, son-in-law.
shwim'-ma, to swim, to float.
shwin'-d'l, 1. swindle, fraud.
 2. dizziness, vertigo.
shwin'-d'l-a, to swindle, to defraud.
shwin'-d'l-ar, swindler.
shwin'-na, sweeny—horse disease.
shwit'-sa, to sweat, to perspire.
shwöb, 1. cock-roach.
 2. a native of Württemberg.
shwö'-gher, brother-in-law.
sî, she.
sib, sieve.
sich, one's self.
sich'-ar, safe, secure.
sich'-ar-hët, security.
sif'-fer, drunkard.
si'-gh'l, seal.
si'-gh'l-a, to seal.
si'-gh'l-waks, sealing wax.
sig'l, a seal, a stamp.
sil'-wer-glet, litharge.
sil'-wer-sand, fine white sand for cleansing tin-ware.
sim'-a-de'-ri, cemetery, burial place
sim'-bild, emblem.
sim'-et, cinnamon.
sim'-e-trin, cinnamon.
sims, cornice.
sin, 1. are; from the verb, *tse saiⁿ*, to be.
 2. mind, sense; the *pl.* is usually employed—*sin'-na*.
sind, sin.
sin'-der, 1. cinder, slag.
 2. sinner.
sind'-flüd, the deluge.
sin'-flüt, the flood—deluge.
sind'-haft, sinful.

sîn'-dich-a, to sin.
sîng'-a, to sing.
sîng'-ar, singer, warbler.
sînk, 1. a place where dishes are washed.
 2. a sink, a depression in the ground.
 3. zinc.
sînk'-ka, to sink.
sîn'-na, 1. the senses, thought.
 2. to contemplate, to meditate.
sîs, sweet.
sîs'-hols, sweet wood, *i. e.*, liquorice root.
sîs'-lich, "sweetish," inclined to be sweet in taste.
sîts, seat.
sit'-sa, to sit.
sî'-wa, seven.
sî'-wa-lse', seventy.
sî'-wa-tsich, seventy.
so, so, thus, such.
so-bal', as soon as, so soon as.
söd'-bren'-na, water brash, heart-burn, acidity of the stomach.
södshît, should.
söd't, growing grain.
so-gâr', even, as much.
sok'-ka, stocking feet.
sol, shall.
söl, sole.
soleh, such.
sol'-ich, such.
sol'-la, to be obliged.
such'-a, to seek, to hunt, to search.
sud'-da, the south.
sud'-la, to slop, or puddle in water.
sud'-lich, 1. southerly; should be *sîd'-lich*.
 2. wet, sloppy weather.
sud'-r-a, to simmer.
suk'-l-a, to suck.
sum, sum.
sum'-mer, summer.
sump, bog, marsh.
sum'-pa, bog, marsh.

sump'-ich, boggy, marshy.
sum'-m'r-flek'-ka, freckles; *lit.*, summer spots.
sun, sun.
sun'-dâk, Sunday.
sun'-der-bâr, wonderful, strange.
sun'-er-bâr, wonderful.
sun'-na-shtich, sunstroke; *lit.*, sun stab.
sun'-nich, sunny.
sunsh't, otherwise, else.
sun'-uf-ga'ng, sunrise.
sun'-un'-er-ga'ng, sunset.
sup'-pa-lef'l, tablespoon; *lit.*, soup spoon.
sup'-pa-shis'l, soup bowl, soup dish.

taks, tax.
takt, 1. tact, aptitude.
 2. time—in music.
tak'-sa, to tax; to impose upon.
ta-lent', talent, gift.
târm, term, limit.
tarn, steeple, spire.
tê, tea; also applied to various household remedies consisting of dried plants.
tê'-kan, teapot.
tesh'-da-ment', testament, a will.
trach'-da, to strive for.
trai, true, faithful.
trai'-lôs, faithless.
trak-dî'-ra, to abuse, to treat with cruelty.
trau'-a, 1. to trust, to confide in.
 2. to betroth, to marry.
traur'-ai', mournfulness, sadness.
truar'-ra, to mourn.
traur'-rich, mournful.
trenk'-ka, to water—as animals.
tren'-i'ng, separation, division.
trên, 1. tear.
 2. a train—as of cars.
tren'-na, to sever.
trînk', a drink.

trink'-ar, a drinker, generally applied to one who is a habitual drinker of liquors.

trink'-ka, to drink.

tri'-w'l-ī'-ra, to annoy, to worry, to plague.

trōsh'-da, to console, to soothe.

trōsht, consolation, relief.

trōsht'-raich, consoling.

truds, in spite of, defiance.

trud'-sa, to be defiant, to be obstinate.

truds'-ich, defiant, willful.

truds'-kop, a defiant person.

trum'-p'l, jew's-harp.

tša, to.

tsāⁿ, tooth.

tsab'-ba, a projection, a knob.

tsāⁿ-flesh, gums—of the mouth.

tša-fri'-da, contented, satisfied.

tsai'-gha, a witness.

tsai'-ghnis, proof, evidence.

tsait, 1. since.

2. time.

tsait'-fer-draib', pastime, amusement.

tsait'-ich, ripe.

tsait'-i'ng, newspaper.

tsait'-lich, by times, early.

tsak'-ka, a prong, or branch, a short projection, as a short branch of a tree.

tsak'-ker-a, to plow.

tsāl, number, enumeration.

tsāⁿ-lād, maxillary bone.

tša-lād', salad, lettuce.

tsām, 1. tame, docile.

2. bridle.

tsā'-ma, 1. to tame, to domesticate.

2. to bridle.

tsam'-ma, together.

tsa'ng, tongs, pincers.

tsank'-ka, to scold.

tsā'-rā, to tease.

tsārd, tender.

tsār'-ik'l, 1. circle.

2. dividers.

tsauⁿ, a pale fence, fence made of slats or clap-boards.

tse, to.

tsē, tough.

tsēⁿ, teeth; *pl.* of *tsāⁿ*.

tse'-a, 1. toe, toes.

2. ten.

tsē'-a-ga-bot'-ta, the decalogue.

tsēb'-cha, uvula, soft palate.

tsēb'-l, uvula, soft palate; from *tsa'ba*—a projection, the word being a form to denote diminutiveness.

tsēb'-l-cha, uvula, soft palate.

tsēck, a score, a reckoning.

tsē'-cha, 1. sign, indication.

2. hands of a clock.

tsē'-dar, cedar.

tsed'l, a ticket.

tsēⁿ-dok-ter, dentist; *lit.*, "teeth" doctor.

tsē'-et, tenth.

tsē'-ga-bot-ta, the decalogue.

tsēk, a tick.

tsē'-la, to count, to enumerate.

tselt, tent.

tsēt'-l, a ticket.

tshump, a jump, a spring.

tshump'-pa, to jump, to spring.

tsich'-dich-a, to chastise, to punish.

tsif'-ar, cipher, figure, numerals.

tsi'-gaiⁿ-ner, gipsy.

tsi'-gha, to move, to pull.

tsi'-gh'l, 1. a bridle.

2. a tile.

tsi'-gh'l-a, to bridle.

tsil, aim, objective point, goal.

tsi'-la, to aim.

tsim'-ber-lich, delicate, debilitated.

tsim'-lich, tolerable, tolerably, pretty or fairly.

tsim'-ma-ra, to work in wood.

tsim-mar-man, a cooper; sometimes applied.

tsin, pewter.

tsin'-da, to light, to ignite.

tsind'-loch, touchhole.

tsind'-pan, pan beneath touch hole of a gun.

tsind'-pul-w'r, priming powder.

tsiñg'-l-a, to move the protruded tongue with rapidity, as a serpent.

tsink'-ü, prong, as of a fork.

tsit'-tar-li, souse; pig's feet jelly.

tsit'-ter-a, to tremble, to quiver.

tsob'-tsi-gh'l, check rein.

tsol, inch.

tsol'-shtâb, foot-rule.

tsol'-t'l, 1. a rag, tatter.

2. a strumpet, prostitute.

tsol'-t'l-a, 1. to drop, or scatter, about.

2. to loaf around—as a strumpet.

tsol'-t'l-ich, ragged.

tsu, to, at.

tsü, closed.

tsu-arsht', first, originally.

tsub'-ba, to pull, to jerk.

tsü'-brüñg-a, 1. to pass time.

2. to accomplish.

3. to bring to—to resuscitate.

tsucht, noise, commotion.

tsucht'-ich, boisterous.

tsucht'-haus, penitentiary.

tsü'-drau-a, confidence, trust.

tsü'-fel-lich, accidental, coincidental.

tsü'-fel'-lich-er-wais', accidentally.

tsü'-fer-drau'-a, reliance, confidence in.

tsü'-flucht, refuge.

tsü'-fal, accident, occurrence.

tsü'-guñg, admission, entrance.

tsü'-geñg-lich, approachable.

tsü'-ge-wa, to give in, to admit, to acknowledge.

tsü'-hää-ra, to listen to, to hear.

tsuk, a moving, a departure.

tsuk'-blash-der, blistering plaster; drawing plaster.

tsuk'-er, sugar.

tsuk'-er-maul, one fond of sweets.

tsuk'-er-sach, candy, confectionery.

tsuk'-ka, to jerk, to pull.

tsü'-kum-ma, to come to, to recover.

tsu-letsht', at last, finally.

tsum, to the; contraction of *tsa*, *tse* or *tsu*, and *dem*.

tsü'-mach-a, to close.

tsü'-mü-da, to expect, to expect from another.

tsü'-nä'-ma, surname.

tsü'-nem-ma, to increase, to improve.

tsuñg, tongue.

tsur, to the; from *tsa*, *tse* or *tsu*, and *der*.

tsü'-rich-da, to prepare, to arrange in order.

tsu-rik', back.

tsü'-rish'-ta, to prepare.

tsü'-sats, an addition, addendum.

tsü'-sed-sa, to add to, to swell in volume.

tsü'-sēⁿ-na, to witness, to look at.

tsü'-shbrech-ä, to encourage.

tsü'-shlak-ham'-mer, sledge hammer.

tsü'-shtand, condition, state.

tsü'-trit, entrance, admission.

tsu'-w'r, tub.

tswai'-f'l, doubt.

tswaig', twig, sprout, a slip for grafting.

tswai'-gha, to graft.

tswai'-w'l, doubt.

tswai'-w'l-haft, doubtful.

tswan'-sich, twenty.

tswan'-sich-t'l, twentieth portion.

tswär'-ich, dwarf.

tswär'-ich-aks, a twibl—a kind of mattock or axe, having two blades, one edge running horizontally and the other transversely.

tswär'-na, to twist.

tsuwō, two.
tswek, aim, object, design.
tsuwō'-kep-ich, of varying mind, undecided; *lit.*, two-headed.
tswek'-mē-sich, proper.
tsuwelf, twelve.
tsuwel'-fa, twelve.
tsuwelft, twelfth.
tsuwelf'-t'l, twelfth.
tsuwēng'-a, to force, to compel.
tsuwik'-'l, fool.
tsuwil'-ich, twilled.
tsuwil'-iñg, twins.
tsuwīng'-a, to subdue, to overcome.
tsuwil'-sar-a, to glitter, to glisten.
tsuwil'-sar-ich, glittering, brilliant.
tsuwil'-w'l, onion, tuber.

uf, 1. open.
 2. on, upon.
 3. open.
uf'-bas-sa, to be careful, to be watchful.
uf'-bin-na, 1. to bind up—as a wound.
 2. to rake and bind.
uf'-brech-a, 1. to break open.
 2. to adjourn.
 3. to fail in business.
uf'-but'-sa, to clean up, to dress up or arrange in order.
uf'-drik'-'l-a, to dry up, to wither.
uf'-em, on the; contraction of *uf dem*.
ū'-fer, bank, shore, landing.
uf'-fiv'-der-a, to improve by feeding.
uf'-gē^a, to sprout, to grow.
uf'-ge-wa, to discontinue, to give up.
uf'-hāū-ra, to cease, to quit.
uf'-hal-da, 1. to keep up, to protract.
 2. to hinder.
uf'-hel-la, to clear up.

uf'-hē-wa, 1. to lift, to raise.
 2. to save, to preserve for future use.
uf'-klō-ra, to clear up.
uf'-kōk-sa, to endeavor to persuade.
uf'-kum-ma, to rise, and prosper.
uf'-lā-da, to load up, or upon.
uf'-'n, on a, upon a.
uf'-nem-ma, 1. to take up—as land.
 2. to arrest.
 3. to entertain.
uf'-pik'-ka, to pick up, to gather.
uf'-rā-ma, to place in order, to arrange, to cleanse.
uf'-rich-tich, upright.
uf'-rōr, uproar, riot.
uf'-sā'gha, to recite—as a lesson.
uf'-shhā-la, to wash dishes; to cleanse and arrange in order.
uf'-shī-wa, to postpone, to delay.
uf'-shitel'-la, 1. to set up, to erect.
 2. to put up—as at a public house.
uf'-shōtō'-sa, to belch.
uf'-shō-see, eructations.
uf'-tsā-ma, to bridle a horse, to harness.
uf'-tsē-ra, to consume.
uf'-tsī-gha, 1. to bring up; to educate.
 2. to wind up.
um, about, for the purpose.
um'-acht, faintness, syncope.
um'-b'r-el, umbrella.
um'-brīng-a, to kill, to destroy.
um'-bshdimt, undecided, doubtful.
um'-fañg, circumference, girth.
um'-gañg, 1. acquaintance, communication.
 2. cohabitation.
um'-gē-ghend, surrounding regions, or area.
um'-gēñg-lich, social.
um'-ge-kērt, confused, to be confused.
um'-hak'-ka, to cut down, to fell.

- um'-hañg*, curtain, window-shade.
um'-henk'ł, window curtain.
um'-kē-ra, to invert, to turn.
um'-kum-ma, to perish.
um'-macht, faint, syncope.
um'-mech-tich, faint, syncope.
um'-mē-ghlich, impossible.
um'-rīñg'-a, to surround.
um'-sē'-na, to look about, to familiarize one's self.
um'-shtand, circumstance, condition.
um'-shten-da, circumstances.
un, and; as a prefix—for which *um* is frequently used—it signifies not, equal to the ordinary prefix in English, as *im* or *un*.
un'-a, below, at the bottom.
ū'-na, without; usually pronounced *â'-na*.
un'-ach'-sam, careless.
un'-a-draus, in the lower part—as a geographic term.
un'-a-drin, in the lower part, in the bottom.
un'-ar, below, beneath.
un'-ard-lich, disorderly, unmannerly.
un'-ar-drik'-ka, to oppress, to keep down.
un'-ar-hos'-sa, drawers; *lit.*, underpants.
un'-ar-rok, petticoat.
un'-ar-shād, difference.
un'-ar-shrift, signature.
un'-ar-shrai'-wa, to subscribe, to sign.
un'-ārsht, lowest, the bottom one.
un'-ār-such'-a, to investigate, to examine.
un'-ar-such'-iñg, investigation, examination.
un'-ar-uart', unexpected.
un'-ba-denkt', inadvertent.
un'-be-kant, unknown.
un'-be-kērt, unconverted.
un'-be-kim'-mert, careless, thoughtless.
un'-ben-ich, unmanageable.
un'-be-wōg'-lich, immovable.
und, and.
un'-end-lich, endless.
un'-ē'-nich, at variance, not in accord.
un'-er-em, below it, under it; contraction of *un'-er dem*.
un'-ēr-lich, dishonest.
un'-ēr-lich-kait, dishonesty.
un'-fer-gleich'-lich, without comparison, unique.
un'-fer-shemt, shameless.
un'-fer-shtand, want of sense.
un'-fer-shten'-ich, senseless, impudent.
un'-fraind-lich, unfriendly.
un'-ga-fēr, about.
un'-ga-hai'-er, excessive, huge.
un'-ga-hai'-er-lich, excessively, immense.
un'-ga-hör-sam, disobedient.
un'-ga-tsif'-fer, vermin.
un'-ga-tso-gha, ill-bred, unmannerly.
uñg'-glik, accident, misfortune.
uñg'-graut, weeds.
uñg'-kosh-ta, costs, damages.
uñg'-kshait, nonsensical, unwise, silly.
un'-glik, accident, misfortune.
un'-glik-lich, unfortunate.
un'-glik'-lich-er-wais', accidentally, unfortunately.
un'-graut, weeds.
un'-gshikt, awkward, clumsy, inapt.
un'-hēm-lich, a sense of discomfort, a feeling of loneliness.
un'-kosh-ta, costs, damages.
un'-man-nir-lich, unmannerly.
un'-mē-ghlich, unlikely.
un'-mensch-lich, cruel, unnatural in disposition, or form.
un'-nids, a good-for-nothing.

un'-nids-ich, useless, good-for-nothing.

un'-recht, wrong.

un' rich-tich, false, incorrect.

un'-röd, trash, dirt.

un'-rū, 1. unrest, restlessness.

2. escapement—of a watch.

un'-rū'-ich, restless.

uns, us.

un'-ser, our, ours.

un'-shik-lich, unsuitable.

un'-shuld, innocence.

un'-shuld-ich, innocent.

un-sich'-bâr, invisible.

un'-tse-frid'-da, dissatisfied, discontented.

un'-wis-sent, unknowing, ignorant.

un'-wöl, unwell, not in good health.

un'-wör-hed, untruth.

ūr, clock.

ur'-dail, judgment, sentence.

ur'-grös-fad'-ter, great grandfather.

ur'-grös-mut'-ter, great grandmother.

ur'-hē-w'r, originator.

ur'-sach, cause, motive, reason.

ur'-shpruñg, origin, source.

ur'-tail, judgment, sentence, opinion.

wā, what.

wāart, value, worth.

wāart'-fol, valuable.

wā'-da, 1. calf of the leg.

2. to wade.

wa'-gha, a wagon.

wa'-gha-glēs, wagon rut.

wa'-gha-réf, tire of wheel.

wa'-gha-shop, wagon shed.

wa'-ghnär, wheelwright.

wâi, hawk.

wāiⁿ, wine.

waib'-ōha, female—of birds.

waibs'-bild, woman.

waibs'-hem, chemise.

waibs'-lait, women.

waibs'-mench, woman.

wai'-da, willow.

wāiⁿ-gâr-da, vineyard.

wai, 1. while.

2. because.

wain'-na, to cry.

wais, white.

wai'-sa, 1. to show, to direct.

2. to whitewash.

wai'-sa-haus, orphans' home.

wai'-sa-kind, orphan.

wais'-darn, haw thorn.

wais'-er-gle'-a, white clover.

wais'-hait, wisdom.

wāiⁿ-shdēⁿ, cream of tartar.

wais'-s'l-a, to whitewash.

wais'-wal-nis, butternut tree.

wait, 1. wide.

2. far, distant.

wak'ar, awake, alert, active.

wak'-ka, quartz, quartzite.

waks, wax.

waks'-ich, flourishing, thrifty.

waks'-knop, lymphatic gland.

waks'-sa, 1. to grow.

2. to wax.

wâl, 1. election.

2. choice.

wal'-nis, walnut.

wal'-nus, walnut.

wals, roller—agricultural.

wal'-sa, 1. to roll—with roller.

2. to waltz.

wam'-ba, stomach, paunch.

wam'-es, jacket.

wan, when, if.

wâⁿ-na, to dwell, to reside.

wand, wall.

wâⁿ-niñg, residence.

wand'l, conduct.

wand'-'l-a, to wander, to loiter.

wank'-'l-mî-dich, fickle, unstable.

wans, 1. bed bug.

2. when it, contraction of *wan* and *es*.

wâr, 1. was.

2. ware, goods.

wār, who.
wâ'-ra, were.
wâ'-ra, will be—*pl.*
wâr'-a-w'l, the top of the scalp from
 which the hair radiate.
ward, word.
wârd, becomes; will.
wâr'-da, to wait.
war-haft'-ich, truly, verily.
war'-i-gha, to choke, to strangle.
wâr'-ik, 1. tow.
 2. a work, edifice, a creation.
war'-ik-haus, workhouse, i. e., peni-
 tentiary.
war'-ik-ka, to choke, to strangle.
wâr'-ik'l-hols, rolling-pin.
wâr'-ik-lich, truly, verily.
war'-ik-sa, to retch, to gag, to
 vomit.
wârk'-ik-gaul, distaff; *lit.*, tow
 horse.
war'm, worm.
wâr'm, warm.
wâr'm-ä, to warn.
wâr'-müt, wormwood.
war'-na, to warn.
war'-niñg, warning, notification.
wâr'-ra, to become:
wâr'-shai'-lich, probable, probably.
warshd, sausage.
warshl, sausage.
wârshl-drech-der, sausage stuffer;
lit., sausage funnel.
wârt, wart, excrescence.
wart, word.
wârt, landlord.
wâr'-ta, to wait, to tarry.
war'-tsel, root.
wâr'-shaft, public house, with bar
 and appurtenances.
wârts'-haus, tavern, inn.
wâr'-tsl, root.
wâr't'-s'l-a, to take root—as plants.
wa-rum', why, wherefore.
was, what; *fer was*—for why—*la*
 usually employed for *why*.

was'-ser, water.
was'-ser-ich, watery.
was'-ser-mi-lân', water melon.
was'-ser-sucht, dropsy.
watsh, a watch.
watsh'-a, to watch.
wê, sore; painful.
wêb, web.
wêb'-shtül, loom.
wech'-lich, weekly.
wed'-d'r, 1. against.
 2. weather.
 3. whether.
 4. a ram—wether.
wed'-d'r-lê-cha, to lighten, lightning.
wed'-d'r-rüt, lightning rod.
wed'-sa, to whet, to sharpen.
weds'-shtâl, steel, for sharpening
 knives.
wêdt, pasture.
wêg, 1. way, road.
 2. direction.
wek, 1. away.
 2. bun, variety of sweet bis-
 cuit.
wêk, 1. way, road.
 2. direction.
wek'-ka, to wake, to awaken.
wek'-lok-ka, to decoy, to call off.
wêk'-mêsh-der, supervisor.
wek'-shaf'-fa, to remove, to destroy.
wek'-s'l, change.
wek'-s'l-a, 1. to change.
 2. to exchange.
wek'-s'l-fî'-wer, intermittent fever.
wek'-ür, alarm clock.
wêk'-wai-ser, mile-post; post erect-
 ed at cross-roads, bearing a
 board upon which is indicated
 the distance to the nearest
 village.
wel, 1. well! which.
 2. wave, breaker.
wê'-la, to elect; to choose.
wol'-bân, axle.
wolk'-ka, to wither, to fade.

welsh'-hâ-na, turkey cock.
welsh'-hink'l, 1. turkey hen.
 2. turkeys.
welsh'-karn, corn, maize.
welt, world.
wem, to whom.
wen'-ich, a little.
wen'-na, to turn.
wen'-rîng, cant hook.
wesh, wash—clothing.
wesh'-a, to wash.
weshb, wasp.
wesh'-lain, clothes line.
wesh'-r'n, laundress.
wesh'-shbel', clothes pin.
wes'-ser-a, to water.
wes'-ser-ich, watery, moist.
wet, would.
wet'-sa, to whet, to sharpen.
wê'-tsa, wheat.
wets'-harn, horn for carrying whet-
 stone.
wets'-kump, horn for carrying whet-
 stone—used by reapers.
wet'-ta, to bet, to wager.
wê'-wa, to weave.
wê'-w'r, weaver.
wê'-w'r-tset'l, warp.
wî, 1. how.
 2. like, as, likewise.
wî'-cha, wick.
wî'-dich, mad, hydrophobia.
wî'-gha, to weigh.
wip, whip.
wip'-ba, to whip, to punish.
wip'-b'r-wil, whip-poor-will.
wich'-dich, important.
wid'-der, again.
wid'-der lich, nauseating.
wid'-d'r-a, to refuse.
wid'-d'r-ga-bort, regeneration.
wid'-d'r-hô'-la, to repeat.
wid'-frâ, widow.
wid'-man, widower.
wid'-d'r-rû'-fa, to recall, to revoke.
wid'-d'r-shprech'-a, to contradict.

wid'-d'r-shtē'n', to resist.
wik, cradle.
wik'-'l, 1. a lap.
 2. a foolish, silly fellow.
wik'-'l-a, to wind, to wrap.
wil, will, wish.
wild, wild, untamed.
wild'-fai-ar, erysipelas.
wild'-flēsh, granulations of a heal-
 ing surface.
wild'-er-bal'-sam, spearmint.
wild'-er-nis, wilderness.
wildt, wild.
wil'-ich, willing.
wil'-kum, welcome.
wil'-la, 1. will—an opinion.
 2. a last will.
win, screw-jack.
wind'-ge-bro'ch-a, heaves.
wind'-ich, windy.
wind'-'l, diaper.
wind'-mîl, windmill, winnowing
 mill.
wind'-shtil, calm.
wind'-shtôs, gust of wind.
wind'-wâr-w'l, whirlwind.
win'-ish, crooked, warped.
wink'-ka, to wink.
wink'-'l, square—tool.
wink'-'l-ai-sa, iron square—tool.
wink'-'l-bôra, brace—tool.
win'-na, 1. to win, to succeed.
 2. bind-weed.
win'-sha, to wish, to desire.
win'-s'l-a, to whine.
wis, a meadow.
wish, a wisp, small brush, a wiper.
wish'-a, to wipe, to brush.
wisht, ugly, disagreeable.
wis'-sa, to know.
wis'-sent-lich, knowingly.
wis'-s'l, 1. weasel.
 2. a small meadow.
wis'-s'n-haft, knowledge.
wits'-ich, witty.
woch, a week.

wod, would.

wōk, 1. a scale.

2. whiffletree.

wol, wool.

wōl, well, healthy.

wolf, wolf.

wolf'-ich, greedy, grasping.

wol'-f'l, cheap.

wol'-ga-mud, mountain sage.

wolk, cloud.

wōl'-kfa'l-la, satisfied with, pleased with.

wolk'-ich, cloudy.

wol'-la, to desire, to wish.

wol'-la-shte'ng-el, mullein, mullein stalk.

wol'-shtrō-mich, brindled.

wōr, true.

wōr'-et, truth.

wōr'-et-sâ-gher, fortune-teller; *lit.*, truth teller.

wōr'-hēd, truth.

wot, would.

wū, where, whither, whence.

wūdt, anger, madness.

wūdt'-shteⁿ, mad-stone.

wu-hāⁿ, whither, whereto.

wund, 1. wound.

2. abraded or chafed.

wund'-graut, golden rod.

wun'-ner-ā, to wonder.

wun'-ner-bâr, wonderful.

wun'-ner-fits, curiosity; an inquisitive person; the desire, or promptings, to inquire or to be inquisitive.

wun'-ner-fits-ich, inquisitive.

wun'-ner-fol', wonderful.

wun'-ner-nās, an inquisitive person.

wun'-ner-sel'-da, seldom, rarely.

wunsh, a wish.

wus'-lich, lively, playful.

wus'-s'l-a, to caper, to be playful, to frisk.

wuts, a pig.

wuts'-l-cha, a shoat.

wuts'-li, shoat.

ya, yes.

yâ, yes.

yacht, noise.

yacht'-ich, noisy, boisterous.

yâ'-gha, 1. to chase.

2. to hunt—game, etc.

ya'-ma-ra, to lament, to moan.

yam'-mer, lamentation.

yâⁿ-ni, Jonathan.

yaⁿ-ni-dan', Jonathan.

yaud'-sa, to shout, to bark.

yē'-der, every one, each one.

yē'-der-er, each one, when reference is made to masc. nouns.

yē'-der-es, each one, when speaking of substances of neuter gender.

yē'-der-î, each one, when alluding to fem. nouns.

yē'-ders, each one—collective.

yē'-gher, a hunter, sportsman.

yem'-ar-lich, pitiful, poorly, pitifully.

yen'-nar, January.

yēr'-lich, yearly.

yīng'-li'ng, a youth.

yīngshd, youngest.

yō, yes. This is a peculiar form, used frequently to signify more than simple affirmation, giving, in fact, an idea of positiveness which could be conveyed only by such expressions as, yes, certainly, etc.

yoch, yoke.

yoch'-a, to yoke.

yō'-hans-graut, St. John's wort.

yok'l, 1. a stupid fellow.

2. Jacob.

yōr, year.

yud, Jew.

yud'-da-kär'-sha, ground cherries.
yü'-li, July.
yuñg, young.
yuñg'-frâ, virgin.
yushd, only, just.

yush'-da-ment, exactly so.
yush'-dis, justice of the peace.
yusht, only, but.
yut, Jew.

Has the Signal Service Degenerated? By William Blasius.

(Read before the American Philosophical Society, January 18, 1889.)

There is of late a growing impression in the public mind that the Signal Service Bureau is degenerating, and is less effective than during its earlier days. The Philadelphia *Public Ledger* gives these impressions a definite form when it refers to the forecasts of that great storm of November 27, 1888, which read: "Fair, except light showers on the coast; northerly wind, becoming variable; stationary temperature," and compares it with the violent storm on that day. It then continues: "It is because the *Ledger* desires to have what may be made a useful service restored to its former 'probability,' that it thus calls attention to failures of somebody at the Washington office to do as good work there as the service is capable of doing, or has heretofore been done."

If such a condition existed, if the Signal Service were no more effective than it used to be in its earlier days, it would be most deplorable; because the little interest the public seemed to take in this most interesting and useful science might die away, and the hope we have for its development be buried with it. Such a result would be still more unfortunate from the fact that this country, by its geographical position and its topographical structure, is better adapted for a successful study of meteorology than any other country on our globe.

The Signal Service has, however, not degenerated, but it has not improved much either, and if it does not change its plan of operation hitherto pursued, I dare say it will be no more effective in the future. The above prognostication, it is true, does not give in advance an idea of a storm that will rage, "with hurricane fury over an extent of seven hundred miles on our coast, from New Jersey to Nova Scotia," but it speaks, at least, of "light showers on the coast." If we compare it, however, with prognostications for similar storms of earlier days—for instance, the storm of August 23, 24 and 25, in the year 1873, extending from New Jersey to Nova Scotia, in which 1032 vessels and about 500 lives were lost, and which was predicted by "fine weather"—the above prediction of "light showers on the coast" must be considered an improvement. At that time

the papers complained of the Signal Service for having indicated that fearful storm with predictions of "fine weather;" and, whether officially or by some friendly service, a kind of an excuse came from Washington that that storm must have passed to the northward and outside of the United States Signal Service stations. In that case the Canadian Signal Service ought to have observed it. But it did not, because it worked on the same method as the United States Signal Service. That storm, however, must have passed somewhere. Then Prof. Abbé, the scientist of the Signal Service, came to the rescue and demonstrated clearly (?) that that storm probably originated near the coast of Senegambia, Africa, on August 13, moving north-westerly across the Atlantic until the 23d, when its course changed to a north-easterly direction, running up the coast of North America, gathering force meanwhile, until it culminated near the coast of Nova Scotia and Newfoundland; after which it continued its course, with diminishing force and increasing size, across the Atlantic, reaching the northern part of Great Britain on the 31st, and Norway on the 2d of September.* This was indeed a remarkable journey of a storm, which becomes more wonderful by the fact that Prof. Abbé located its centre about two hundred miles away from the coast, yet reported the greatest or rather all destruction as taking place on the coast!

The affair became quite amusing as well as interesting to me. I procured the Signal Service charts of the state of the atmosphere over the United States, and showed by their own maps that the storm had come from Manitoba, crossed the country by way of the lakes over the Signal Service stations, to the south-east and east to the coast from New Jersey to Nova Scotia.† To the uninitiated it may appear incomprehensible that a storm should travel over the United States Signal Service stations as a bringer of "fair weather," and develop to such fury and severity on the coast. But such is the case.

The reason for this apparent paradox consists in the fact that the leading meteorologists define a storm or cyclone as an area of low barometric pressure. A storm is, therefore, not expected unless the barometer begins to fall. The area of high pressure or the anticyclone, according to their rules, brings fair weather. I have shown, as early as 1851, that this theory is not correct, and that the area of low barometric pressure is not the storm but only the *effect* of the storm, and that the areas of high barometric pressure, under certain circumstances, bring the most violent and destructive storms, especially when they reach our coast.‡ I am corroborated in my views by practical men such as the late Com. Wyman, Chief of the Hydrographic Office, Bureau of Navigation, United States Navy, who says in a letter to me: "It [my book] is borne out by my experi-

* Chief Signal Officer's Report for 1873, p. 1025, Appendix E.

† Storms, their Nature, Classification and Laws, etc., pp. 180-197. Porter & Coates, 1875.

‡ *Ibid.*, pp. 91-114.

ence," and others; and also by the accounts of almost every violent storm. In explaining that storm, it was also shown that the Signal Service might have telegraphed it to the coast three days in advance, if they had acted according to the views above presented, instead of following the old traditional theories.

I have since on similar occasions called attention to the characteristics of this kind of storms, and the fact that the Signal Service men have this time predicted, at least, "light showers on the coast," shows some progress.

There is another fact to show that the Signal Service during the last few years is not degenerating, but improving. It consists in the practical adoption, at least sometimes, of the law of oscillations in air movements, as published in my work on "Storms," instead of the rotary law heretofore followed.

Those unacquainted with the science will understand this important change better when I indicate the effect in the prognostications. In the earlier days the prognostications contained the information of the approach of a cyclone or anticyclone, or what is identical, of an area of low or high pressure. Now we read of the approach of a *warm* or a *cold* wave. That the present indications are of more practical value to the public than the former must be obvious to any one who gives the subject any thought at all. A knowledge in advance of a change in the temperature or moisture of the atmosphere assists us in regulating our health, our industries and, in short, everything that relates to the comforts of life. The fact that the pressure will be a little more or less does not materially affect us. The predictions according to the oscillation law, or the warm and cold air movement, did not prove so effective as they would have been, had they not also retained the old traditional theory of a cyclonic air movement at the same time. To assume a straight line air movement and, at the same time, that of a cyclone, must cause confusion in the predictions.

When at the close of the war, at the suggestion of the late Prof. Henry, the Signal Corps was changed into the Signal Service Bureau, and every soldier and officer of it became, at one stroke of the pen, a full-fledged meteorologist, I expected that with the aids and resources at their disposal they could not help stumbling upon some very important discoveries which I had made some thirteen years previous. General Meyer was an excellent organizer, but he created, after all, only a machine, a body without a soul. Seeing how observations were made, I became convinced that they would not reach any valuable results necessary for successful practical progress.

The public is accustomed to assume that he who gets an office, gets also the necessary knowledge and wisdom for it. The public wants to harvest where it has not sown, and it had to be satisfied. So General Meyer managed to get high percentages in verifications. He showed progress by increasing them. The beginning was already as high as seventy-five per

cent, and they have reached as high as ninety-five per cent. The public was elated to have the best Signal Service in the world, and did not care to test the matter. Now General Greely cannot well exceed one hundred per cent, and he cannot well go back to a more justified number, and the public then thinks that the Signal Service is degenerating. Thus General Greely has to bear the sins committed by his predecessors. General Greely is as well calculated for his important position as any of his predecessors, if not better. But the Signal Service will not become better nor grow worse than it always has been, unless General Greely commences from anew and does what General Meyer ought to have done in the beginning. To establish correct laws ought to be his first and principal aim. The fact that, at the end of nearly a quarter of a century's hard work, the public begins to think that the Signal Service is not as effective any more as in its earlier days when it could not be anything, is sufficient to prove that the laws hitherto followed are wrong.

In view of the foregoing, I beg leave to make the following suggestions for the improvement of the Signal Service Bureau :—

Find the true laws. This country offers all advantages. Let the predicting, in the meantime, go on in the usual way to satisfy the public. It cannot become worse than it has been hitherto, by taking away half a dozen or a dozen of the most intelligent men, and making them an investigating corps. Have them taught, above all, to *see correctly* in order to be able to read nature as well as antiquated books and meteorological instruments—the latter any school-boy can do. Teach these men to compare what they have seen and with common sense work it into laws, as Franklin did. The less these men know of antiquated traditional theories taught by professors who never digested them themselves, the better they are calculated for their work.

Let General Greely shake off such authorities that hide their ignorance in high-sounding hollow phrases, and who compliment each other by copying each other's undigested works, and start anew with such an investigating corps prepared in the above-mentioned way, and the Signal Service will soon be in the condition to show real progress. In this country the meteorological laws are exhibited so plainly that anybody who has learned to see nature correctly, without being biased in his mind, cannot fail to learn them.

Alphabetical List of Obituary Notices published in the Transactions and Proceedings of the American Philosophical Society.

By Henry Phillips, Jr.

(Read before the American Philosophical Society, February 1, 1889.)

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Stated Meeting, January 18, 1889.

Present, 21 members.

President, Mr. FRALEY, in the Chair.

Mr. Arthur Biddle, a lately elected member, was presented to the Chair and took his seat.

Correspondence was submitted as follows, viz.:

A circular requesting the attention of the Society in behalf of the Philhellenic Society, Amsterdam, Holland.

Letters of acknowledgment were received from the Hungarian Academy, Budapest (127); Naturforschende Gesellschaft des Osterlandes, Altenburg (122-127).

Letters of envoy were received from the Bureau des Longitudes, Paris; U. S. Coast and Geodetic Survey, Washington D. C.

A letter from the President of the Society stating that he had appointed Mr. Craig Biddle to prepare an obituary of the late Casper Wistar, M.D., and that the appointment had been accepted.

A letter requesting exchanges was read from the Aachener Geschichtsverein, which was granted, and the Society ordered to receive Proceedings from No. 96.

Accessions to the Library were announced from the Royal Asiatic Society, North China Branch, Shanghai; Government Observatory, Madras; Hungarian Academy, Budapest; K. Nordeske Oldskrift-Selskaf, Copenhagen; Anthropologische Gesellschaft, Wien; Naturforschende Gesellschaft des Osterlandes, Altenburg; Deutsche Geologische Gesellschaft, Messrs. R. Friedländer & Sohn, Redaktion "Naturwissenschaftliche Wochenschrift," Berlin; Société des Sciences Physiques et Naturelles, Académie N. des Sciences, Bordeaux; Société Zoologique de France, Société de Géographie, Ecole des Mines, Bureau des Longitudes, Paris; Société des Antiquaires de la Morinie, Saint-Omer; Philosophical Society, Cambridge, Eng.; Royal Society, R. Meteorological Society, Editor of the "Geological Magazine," London; American Academy of Arts and Sciences, Boston, Mass.; Publisher of "The Travellers' Record," Hartford; Entomological Society, Brooklyn; Historical Society, American Chemical Society, Mrs. J. W. Barrow, New York; Mr. Charles W. Darling, Utica; College of Pharmacy, Franklin Institute, Mr. Henry Phillips, Jr., Philadelphia; Prof. Ira Remsen, Baltimore; U. S. Geological Survey, U. S. National Museum, U. S. Coast and Geodetic Survey, Mr. James P. Kimball, Washington, D. C.; Elisha Mitchell Scientific Society, Raleigh; State Board of Health, Nashville; University of California, Sacramento; Observatorio Meteorológico-Magnético-Central, Mexico.

The Committee on the *Codex Poinsett* reported progress, and was continued.

The Committee on Prof. Cope's paper was continued.

The stated business of the evening was then taken up, and

an election for Librarian being held, Mr. Henry Phillips, Jr., was unanimously re-elected to that position.

On motion, the President was authorized to appoint at his leisure the Standing Committees of the Society, which were subsequently reported by him as follows:

Finance.

Henry Winsor, William B. Rogers, Phillip C. Garrett.

Publication.

Daniel G. Brinton, George H. Horn, Samuel Wagner,
Patterson DuBois, Horace Jayne.

Hall.

J. Sergeant Price, William A. Ingham, Charles A. Oliver.

Library.

Edwin J. Houston, William V. McKean, Wm. John Potts,
Jesse Y. Burk, William H. Greene.

Mr. William Blasius read a paper, "Is the Signal Service Degenerating?" and subsequently made some oral remarks on subjects connected with meteorology in general.

Dr. Morris offered a suggestion as to the probable equivalent in our modern English speech of the ancient Hebrew word—Amen. Sometimes such equivalents may be found in terms that are marked in our dictionaries as obsolete, or provincial, or in terms now in use only among the lower and more ignorant classes. Thus he had on one occasion been much struck by the description given by an unlettered negro, of a certain pain as a "gugawing" one. We can, in this case, easily trace the origin, as of a dog gnawing at a bone. So, in rendering our assent to a proposition forcibly, we often, to-day, do so with a nod of the head and the utterance of a sound better represented by the letters m'h'n, than by any other. Is not this then to be regarded as the modern representative of this form of earnest solemn assertion?

The Committee on the Communication of Prof. Goodfellow

and the Resolution of Prof. Lesley in relation to the U. S. Coast Survey, reported the following preamble and resolutions, which were unanimously adopted :

WHEREAS, The American Philosophical Society having a deep interest in scientific investigation, has heretofore taken occasion to express its opinion as to the propriety of the appointment of scientific men for high scientific positions ;

AND WHEREAS, The American Philosophical Society recognizes the advisability of appointing as Superintendent of the Coast and Geodetic Survey a man of the highest ability, experience and character, be it therefore,

Resolved, That this Society regards Richard Meade Bache as one fulfilling all these requirements ; that his training on the Survey for a period of nearly forty years, his familiarity with its methods and history, his general knowledge and scientific culture, would make the appointment an eminently fit one, and would assure to the work the maintenance of that high standard of usefulness to the people and to the Government which it reached under the distinguished administrations of Alexander Dallas Bache and Benjamin Peirce.

Resolved, That this Society recommend the said Richard Meade Bache as in every way qualified for the Superintendency of the Survey.

Resolved, That a Committee of three members of this Society be appointed to proceed to Washington and lay there these resolutions before the President.

The President of the Society and Messrs. Dudley and Haupt were appointed the Committee referred to in the resolution.

And the Society was adjourned by the President.

Stated Meeting, February 1, 1889.

Present, 16 members.

Vice-President, Dr. RUSCHENBERGER, in the Chair.

Correspondence was submitted as follows :

A letter from the Marchese Antonio de Gregorio (Palermo), accepting membership.

A circular from the Society for the Promotion of the Study of Modern Greek, Leyden, Netherlands.

A circular from the American Oriental Society requesting information as to whether the American Philosophical Society possessed any Oriental manuscripts.

Program of La Société Batave de Philosophie Experimentale de Rotterdam.

Circular relating to the Bressa Prize of the Royal Academy of Turin to be awarded after December, 1890.

Letters of envoy were received from the Mining Department, Melbourne, Victoria; Verein für Erdkunde, Dresden; Meteorological Office, London, Eng.; New Haven Colony Historical Society, New Haven, Conn.; Prof. N. H. Winchell, Minneapolis, Minn.; Oficina Meteorologico Argentina, Cordoba.

Acknowledgments for 128 were received from Mr. Horatio Hale, Clinton, Canada; Sir J. W. Dawson, Montreal; Geological and Natural History Survey, Ottawa; Sir Daniel Wilson, Toronto; Society of Natural History, Portland, Me.; New Hampshire Historical Society, Concord; Prof. Charles Henry Hitchcock, Hanover, N. H.; Mr. Robert N. Toppan, Cambridge; Massachusetts Historical Society, American Statistical Association, Public Library, State Library of Massachusetts, Messrs. Stephen P. Sharples, Robert C. Winthrop, Boston; Free Public Library, New Bedford; Rev. Edward E. Hale, Roxbury; Essex Institute, Salem; Rhode Island Historical Society, Prof. Thomas Chase, Providence, R. I.; Yale University, New Haven Colony Historical Society, New Haven; Connecticut Historical Society, Hartford.

A circular from the Audubon Monument Association of New York asking for contributions.

A letter was read from Mr. Robert Patterson in answer to one from Secretary Phillips, relating to the portraits of Robert Patterson and Robert M. Patterson owned by the Society, of which it has no record. Mr. Patterson states that he has in his possession, a portrait of Robert Patterson painted by Rembrandt Peale, but is unable to say if the one belonging to the Society is an original or a copy.

That the portrait of Robert M. Patterson owned by the Society was a *replica* painted by Mr. Samuel F. DuBois, his

nephew, and presented to the Society by Mr. Patterson's widow.

A letter from Mr. J. C. Pilling requesting the loan of a work on the Society's Library, which was not granted.

Accessions to the Library were received from the Royal Society of Victoria, Department of Mines, Melbourne; Gesellschaft für Erdkunde, Gesellschaft für Anthropologie, Ethnologie und Urgeschichte, K. P. Meteorologische Institut, Berlin; Prof. Dr. August Boltz, Darmstadt; Verein für Erdkunde, Dresden; Verein für Erdkunde, Halle a.S.; Nassauischer Verein für Naturkunde, Wiesbaden; Alterthumsverein für Zwickau und Umgegend, Zwickau; "Flora Batava," Leiden; Académie Royal de Belgique, Bruxelles; Société de Géographie, Paris; Société d'Emulation des Côtes-du-Nord, Saint Brienc; R. Academia de la Historia, Madrid; Natural History Society, Montreal; Peabody Museum, Harvard College, Museum of Comparative Zoölogy, Cambridge; Essex Institute, Salem; Meteorological Observatory, Mr. John Eyer- man, New York; New Jersey Historical Society, Newark; Prof. E. D. Cope, Messrs. Francis Jordan, Jr., Bois Penrose, Henry Phillips, Jr., Dr. Ruschenberger, Philadelphia; Department of State, Bureau of Education, Chief of Engineers, Anthropological Society, Smithsonian Institution, Washington, D. C.; State Historical Society, Iowa City; Prof. N. H. Win- chell, St. Paul; Mr. Francisco Canton Rosado, Mérida, Yuca- tan; Sociedad Científica "Antonio Alzate," Mexico; Oficina Meteorológico Argentina, Buenos Aires.

Mr. John Fulton presented a photograph of himself.

The Audubon Monument Committee presented an engraving of John J. Audubon.

The Committee on the Codex Poinsett reported progress, and was continued.

The Committee on Prof. Cope's Paper reported progress, and was continued.

Mr. Phillips presented for the Proceedings "An Alphabetical List of Obituary Notices published in the Transactions and Proceedings of the Society."

Mr. Phillips presented "A Supplemental Register of Papers published in the Proceedings of the Society from No. 115 to 128 (Vol. XXI to XXIV), 1881-1889," completing the Register prepared by him in 1880.

Also a Subject Register of Communications published by the Society in its Transactions and Proceedings.

The Secretaries were authorized to have a sufficient number of these printed separately for general use.

Mr. Phillips read an account of the Congo Free State.

Dr. Rothrock made an oral communication in reference to Forestry in Pennsylvania.

New nominations 1183, 1184 and 1185 were read.

On motion of Prof. Rothrock the Society resolved to appropriate a sum not to exceed \$50, to enable the Committee on the Michaux Legacy to transmit from the Society to the Jardin des Plantes, Paris, a duplicate set of photographs of American trees.

And the meeting was adjourned by the presiding member.

Stated Meeting, February 15, 1889.

Present, 15 members.

President, Mr. FRALEY, in the Chair.

Correspondence was submitted as follows:

A letter from Prof. Steiner, of Darmstadt, in relation to *Pasilengua*, etc., dated January 20, 1889.

A circular from the U. S. Commission to the Paris Exposition of 1889, in reference to the same.

Letters from the Observatoire de Zoologie, Villefranche-Sur-Mer, and the Geological and Natural History Survey of Minnesota, requesting to be placed on the exchange list, which, on motion, was so ordered from Proceedings 129.

Letters of envoy from Physikalische Central-Observatorium, St. Petersburg; Boston Society of Natural History; U. S.

Geological Survey, Indiana Society of Civil Engineers and Surveyors, Remington.

Letters of acknowledgment were received from the North China Branch, Royal Asiatic Society, Shanghai (124, 125); Prof. Peter Tunner, Leoben, Austria (127); Accademia degli Agiati, Rovereto, Austria (125-127); Public Library, Boston Society of Natural History, Boston (127); Mr. Arthur Biddle, Philadelphia (127).

Letters of acknowledgment for 128 were received from Mr. Alfred Selwyn, Ottawa; University of Toronto; American Antiquarian Society, Worcester; Prof. William D. Whitney, New Haven; Buffalo Society of Natural Sciences; Prof. Edward North, Clinton, N. Y.; Prof. T. F. Crane, Ithaca; Astor Library, New York Hospital, University of the City of New York, Historical Society, Drs. J. A. Allen, J. J. Stevenson, New York City; Vassar Brothers' Institute, Poughkeepsie; Oneida Historical Society, Utica; U. S. Military Academy, West Point; Prof. Henry M. Baird, Yonkers; Rev. Joseph F. Garrison, Mr. Isaac C. Martindale, Camden; New Jersey Historical Society, Newark; Prof. George H. Cook, New Brunswick, N. J.; Prof. Charles A. Young, Princeton, N. J.; Dr. Charles B. Dudley, Altoona; Dr. Traill Green, Profs. J. W. Moore, Thomas C. Porter, Easton; Mr. Andrew S. McCreath, Harrisburg; Dr. Lyman B. Hall, Haverford; Dr. John Curwen, Warren, Pa.; Mr. Ario Pardee, Hazleton Pa; Mr. John Fulton, Johnstown, Pa.; Mr. Elisha Kent Kane, Kane, Pa.; Linnean Scientific and Historical Society, Lancaster, Pa.; Mr. Peter F. Rothermel, Linfield, Pa.; Franklin Institute, Pennsylvania Hospital, Wagner Free Institute, Library Company of Philadelphia, College of Physicians, Athenæum, Messrs. John Ashhurst, R. Meade Bache, Arthur Biddle, Craig Biddle, Geo. D. Boardman, W. G. A. Bonwill, John H. Brinton, Isaac Burk, Jesse Y. Burk, S. Castner, Jr., Thos. M. Cleemann, E. D. Cope, Samuel Dickson, Patterson DuBois, Philip C. Garrett, F. A. Genth, Frederick Graff, George Harding, J. S. Harris, H. V. Hilprecht, G. H. Horn, Edwin J. Houston, E. J. James, William W. Jefferis, Francis Jordan, Jr., W. W. Keen, J. P.

Lesley, Morris Longstreth, John Marshall, E. Y. McCauley, F. A. Muhlenberg, Isaac Norris, Charles A. Oliver, John H. Packard, C. Stuart Patterson, Robert Patterson, C. N. Peirce, Henry Pemberton, Henry Phillips, Jr., Franklin Platt, J. Sergeant Price, Theo. D. Rand, T. B. Reed, James W. Robins, J. T. Rothrock, W. S. W. Rutschenberger, Samuel P. Sadtler, C. E. Sajous, Lewis A. Scott, Oswald Seidensticker, Isaac Sharpless, Aubrey H. Smith, Edgar F. Smith, H. C. Trumbull, James Tyson, Samuel Wagner, W. H. Wahl, E. H. Weil, Talcott Williams, Henry D. Wireman, Philadelphia; Heber S. Thompson, Pottsville, Pa.; Lackawanna Institute of Science, Scranton, Pa.; Philosophical Society, Mr. Philip P. Sharples, West Chester, Pa.; Mr. W. M. Canby, Wilmington, Del.; Peabody Institute, Maryland Institute, Johns Hopkins University, Baltimore; Library of the Signal Office, U. S. Geological Survey, Surgeon-General's Office, Messrs. J. H. C. Coffin, Albert S. Gatschet, Charles A. Schott, William Strong, Capt. Thomas J. Lee, Washington, D. C.; Prof. J. W. Mallett, Leander McCormick Observatory, University of Virginia; Elliott Society of Science and Art, Charleston, S. C.; University of South Carolina, Columbia; Georgia Historical Society, Savannah; University of Alabama, Tuscaloosa; E. W. Claypole, Akron, Ohio; Society of Natural History, Cincinnati Observatory, Prof. J. M. Hart, Cincinnati, O.; Prof. Leo Lesquereux, Columbus; Rev. Henry S. Osborn, Oxford, Ohio; Denison University, Granville, Ohio; Kentucky Historical Society, Frankfort; Dr. Robert Peter, Lexington, Ky.; Prof. John C. Branner, Little Rock, Arkansas; Prof. Daniel Kirkwood, Bloomington, Ind.; Indiana Society of Civil Engineers and Surveyors, Remington, Ind.; Chicago Historical Society; Rev. Stephen D. Peet, Mendon, Ill.; Col. William Ludlow, Detroit; Michigan State Library, Lansing; Mr. Charles R. Keyes, Burlington, Iowa; State Historical Society of Wisconsin, Madison; Academy of Natural Science, Davenport, Iowa; Washburn College, Kansas State Library, Topeka, Kans.; Colorado Scientific Society, Denver; University of California, Prof. John LeConte, Berkeley, Cal.; Mr. George Davidson, San Francisco.

Accessions to the Library were received from the Society of Finnish Literature, Helsingfors, Finland; Naturforscher-Verein, Riga; Académie Imperiale des Sciences, Physical Central Observatory, St. Petersburg; Dr. A. Boltz, Leipzig; K. B. Akademie der Wissenschaften, Deutsche Gesellschaft für Anthropologie, München; R. Accademia dei Lincei, Rome; Mr. José F. de Peralta, Bruxelles; Prof. E. Renevier, Lausanne; Mr. Alphon Picht, Genève; Mr. L. Selbor, Madrid; Instituto y Observatorio de Marina, San Fernando; Society of Arts, London; Royal Geological Society of Cornwall, Penzance; Society of Natural History, Boston; Harvard University, Cambridge; Mr. James B. Francis, Lowell, Mass.; New Haven Colony Historical Society; Astor Library, New York Historical Society, New York; Empire State Association of Deaf-Mutes, Rome, N. Y.; New Jersey Historical Society; American Pharmaceutical Association, Messrs. Angelo Heilprin, Thomas H. Dudley, Charles R. Keyes, James Mooney, Henry Phillips, Jr., De Forest Willard, Dr. Persifor Frazer, Philadelphia; Johns Hopkins University, Baltimore; Bureau of Education, Hon. J. D. Cameron, Chief Signal Officer, U. S. Lighthouse Board, U. S. Geological Survey; Denison University, Granville, Ohio; State University of Iowa, Iowa City; Indiana Society of Civil Engineers and Surveyors, Indianapolis; Rev. Stephen D. Peet, Mendon, Ill.; Kansas State Historical Society, Topeka.

The Committee on Prof. Cope's Paper for the Transactions reported in favor of publishing the same, and, on motion, the Committee was discharged and the paper referred to the Publication Committee for action.

The Committee on the Codex Poinsett reported progress, and was continued.

The death of Prof. Guiseppe Meneghini, Pisa, January 29, 1889, was announced.

The minutes of the Board of Officers and Council were submitted, and the following resolution adopted by the Board was considered:

Resolved, "The Board recommend that the Society should authorize the printing of such portions of the minutes of the Board of Officers and

Council as to the Secretaries should seem desirable, and that a sufficient sum of money be appropriated to have the aforesaid minutes prepared and published."

On motion of Mr. Dudley action was deferred until the next stated meeting of the Society, and the Librarian was directed to obtain in the *interim* an approximate estimate of the cost of such publication.

A communication was made by Prof. Cope "On the Mammalia obtained by the Naturalist Scientific Expedition to Southern Brazil."

Mr. Lyman exhibited and presented a map of the New Boston and Morea Coal Lands, Schuylkill county, Pa.

Pending nominations Nos. 1183, 1184 and 1185 were read.

Mr. Price, from the Committee on the Henry M. Phillips' Prize Essay Fund, reported that the engrossed resolution of thanks of the Society had been sent Miss Emily Phillips.

The report of the Trustees of the Building Fund was presented.

And the Society was adjourned by the President.

Stated Meeting, March 1, 1889.

Present, 10 members.

Vice-President, Dr. RUSCHENBERGER, in the Chair.

Correspondence was submitted as follows:

Letter from the K. Leopold-Carolinische Deutsche Akademie der Naturforscher, Halle a. S., requesting missing pages 483 to 498 of Proceedings, Vol. XIX, No. 109.

Letters of envoy were received from the K. Leopold-Carolinische Deutsche Akademie der Naturforscher, Halle a. S.; K. Sächsische Gesellschaft der Wissenschaften, Leipzig; Royal Statistical Society, Meteorological Office, London, Eng.

Letters of acknowledgment were received from the Royal Society of Edinburg, Scotland (Trans. XVI, 2); Royal Society of New South Wales, Sydney (127); K. Leopold-Carolinische Deutsche Akademie der Naturforscher, Halle a. S. (123-127);

New Haven Colony Historical Society, Conn. (96-128); Mr. George Harding, Philadelphia (127); Cincinnati, O., Society of Natural History (127); Prof. B. G. Wilder, Ithaca, N. Y.; New York Academy of Sciences, Dr. J. S. Newberry, New York, N. Y.; Dr. R. H. Alison, Ardmore, Pa.; State Library of Pennsylvania, Harrisburg, Pa.; Mr. J. B. F. Carll, Pleasantville, Pa.; Mr. P. W. Sheaffer, Pottsville, Pa.; Dr. John Curwen, Warren, Pa.; Naval Institute, Annapolis, Md.; Maryland Historical Society, Baltimore, Md.; Geological Survey, Signal Office, Library of the Surgeon-General's Office, Washington, D. C.; Prof. Joseph LeConte, Berkeley, Cal. (128).

A letter was read from a member of the Committee on Art and Exhibitions of the Centennial Celebration of the Inauguration of Washington, as President of the United States, requesting the loan, for exhibition in New York, of Sully's portrait of Jefferson owned by the Society.

On motion of Mr. Vaux, the application was ordered to lie on the table.

Accessions to the Library were received from the Royal Society of New South Wales, Sydney, Australia; Geological Survey of India, Calcutta; R. Statistika Central Byrån, Stockholm, Sweden; Verein zur Beförderung des Gartenbaues in den K. Preuss. Staaten, Messrs. R. Friedländer & Sohn, Berlin; K. Leopold-Carolinische Akademie der Deutschen Naturforscher, Halle a. S.; K. Sächsische Gesellschaft der Wissenschaften, Leipzig; Ministro della Publica Istruzione, Firenze, Italia; Société d'Ethnographie, S. A. le Prince Albert de Monaco, Paris, France; Royal Statistical Society, London, Eng.; Natural History Society, New Castle-upon-Tyne, Eng.; Rev. C. G. Ames, Boston, Mass.; Yale College, New Haven, Conn.; Mr. W. Danmar, Brooklyn, N. Y.; Pennsylvania Historical Society, Dr. Persifor Frazer, Messrs. B. S. Lyman, Henry Phillips, Jr., Philadelphia, Pa.; Society of Natural History, Cincinnati, O.; Dr. D. A. McLachlan, Ann Arbor, Mich.; Museo Michoacano, Morelia, Mexico.

The Committee on Publication presented a report on Prof. Cope's paper, and publication was ordered.

Committee on Codex Poinsett reported progress, and was continued.

Some remarks were made relating to the supposed lack of harmony between primary and later instruction in French schools and universities.

Attention was called to the late discoveries by Prince Albert de Monaco relating to the alimentation of shipwrecked persons, and the importance of the subject in its relation to anthropophagy.

Secretary Phillips made the announcement of the date of meeting of the following associations in Paris during the month of August, 1889 :

Congres d'Geographie, August 5 to 12.

Association Française, August 8 to 15.

Congres d'Anthropologie, August 19 to 26.

Mr. George B. Wood exhibited and presented a photograph of a projectile emerging from the muzzle of Pneumatic Dynamite Torpedo Gun, taken in 1887, by Major William F. Randolph, U. S. A.

Estimates for printing the minutes of the Board of Officers and Council were presented; on motion, the consideration of the same was postponed until the next stated meeting of the Society.

Pending nominations Nos. 1183, 1184, 1885 and new nominations 1186 and 1187 were read.

And the Society was adjourned by the presiding member.

Stated Meeting, March 15, 1889.

Present, 9 members.

Vice-President, Dr. RUSCHENBERGER, in the Chair.

Correspondence was submitted as follows:

An invitation to attend an unveiling of a memorial to Dr. Joseph Priestly in the First Unitarian Church of Philadelphia, to take place March 13, 1889.

A letter from Dr. P. Steiner, of Darmstadt, in reference to his system of *Pasilengua*, on which no action was deemed necessary to be taken.

Letters of acknowledgment were received from Mr. M. H. Boyé, Coopersburg, Pa.; Mr. George Stuart, Philadelphia, Pa. (No. 128).

Letters of envoy were received from the Observatoire Astronomique et Physique, Tachkent, Russia; Meteorological Office, London, Eng.; Royal Irish Academy, Dublin; Museo Nacional, Buenos Aires, S. A.

Accessions to the Library were announced from the South African Philosophical Society, Cape Town; Société des Naturalistes, Kieff, Russia; K. K. Zoologisch-Botanische Gesellschaft, Vienna, Austria; Prof. Leopold Einstein, Nürnberg, Bavaria; S. A. le Prince de Monaco, Paris, France; R. Academia de Ciencias Naturales y Artes, Barcelona, Spain; Yorkshire Geological and Polytechnic Society, Halifax, Eng.; Meteorological Office, Geological Society, Dr. Benjamin Ward Richardson, London, Eng.; R. Irish Academy, Dublin; Mr. Charles J. Hoadley, Hartford, Conn.; Scientific Association, Meriden, Conn.; New York Academy of Medicine, Prof. J. S. Newberry, New York, N. Y.; Mr. William John Potts, Camden, N. J.; Mr. Henry Phillips, Jr., Dr. J. T. Rothrock, Philadelphia, Pa.; Johns Hopkins University, Baltimore, Md.; Smithsonian Institution, Col. Garrick Mallery, Washington, D. C.; University of Nebraska, Lincoln; Museo Nacional, Buenos Aires, S. A.

The death of Mr. John Ericson, New York City, N. Y., March 7, 1889, æt. 83, was reported.

The Committee on the Codex Poinsett reported progress, and was continued.

The consideration of the question of publishing the minutes of the Board of Officers and Council was postponed until the next stated meeting of the Society.

Pending nominations 1183, 1184, 1185, 1186 and 1187 were read.

On motion of Prof. Cope, permission was granted him to withdraw the paper lately offered by him for the Transactions of the Society.

And the Society was adjourned by the presiding member.

Stated Meeting, April 5, 1889.

Present, 14 members.

President, Mr. FRALEY, in the Chair.

Correspondence was submitted as follows:

A letter from the R. Accademia delle Scienze, Turin, announcing the death of its President.

A circular inviting subscriptions for a monument to Antonio Rosmini in Milano.

Letters of envoy were received from the Mining Department, Melbourne, Victoria; Université R. de Norvège, Christiana; K. Geologische Landesanstalt und Bergakademie, Berlin, Prussia; Literary and Philosophical Society, Manchester, Eng.; New York State Library, Albany.

Accessions to the Library were announced from the Department of Mines, Melbourne, Australia; Geological Survey of India, Calcutta; Institut Égyptien, Cairo; Tashkend Observatory, Tashkend; Académie des Sciences, Krakow; K. P. Geologische Landesanstalt und Bergakademie, Berlin; Oberlausitze Gesellschaft der Wissenschaften, Görlitz; K. Gesellschaft der Wissenschaften, Göttingen; Académie Royale de Copenhague; Bibliothèque de l'Université, Christiana; Société Royale Malacologique de Belgique, Bruxelles; Philosophical Society, Cambridge, Eng.; Royal Institution of Great Britain, London, Eng.; Literary and Philosophical Society, Manchester, Eng.; Geological Society, Glasgow; Rhode Island Historical Society, Providence; Mr. Augustus Schoonmaker, New York; Mr. W. J. Potts, Camden, N. J.; Academy of Natural Sciences, Board of Directors of City Trusts, Germantown Dispensary and Hospital, Messrs. W. S. Baker, Henry Phillips, Jr., Dr. J. Cheston Morris, Philadelphia, Pa.; U. S. Naval Institute, Annapolis, Md.; Johns Hopkins University, Editor of the "American Journal of Philology," Baltimore, Md.; Bureau of Education, Adjutant General's Office, Smithsonian Institution, U. S. Commission of Fish and Fisheries, Washington, D. C.; General

Thomas Ewing, Marietta, O.; Sociedad de Geografia y Estadística, Mexico; University of California, Sacramento, Cal.

The Committee on Publication reported that it had examined the communication of George Simpson on the "Fossils of the Helderberg Series," and that it recommended its publication in the Transactions of the Society, which was so ordered.

The Committee chosen January 6, 1888,* to assist the Commission appointed by the State of Pennsylvania in the examination of the defects of English orthography, presented the following report, of which, on motion, the Secretaries were directed to have a sufficient number printed separately for general distribution, and the Committee was continued.

Report of the Committee Appointed (January 6, 1888) by the American Philosophical Society to Assist the Commission on Amended Orthography, Created by Virtue of a Resolution of the Legislature of Pennsylvania.

(Read before the American Philosophical Society, April 5, 1889.)

The literature of the subject of "Spelling Reform" is already extensive, and, for its purposes, sufficiently exhaustive. The most eminent filologists in England and America have contributed to it, and the public testimony in favor of reform is from filologists, linguists, scientists, statesmen, educators, editors and literary workers in general.

In view of this, your Committee recognizes that there are practically no new facts to be brought out to strengthen the argument on either side. What it aims to do, then, is to present, in a logical and conclusive manner, the known facts in the case, together with a consensus of opinions drawn from high sources, in so far as they illustrate the points at issue.

In this way, your Committee designs to review the whole problem, so that the objective point, the recommendation of the State Commission that certain simplified spellings be employed in the public documents, can be intelligently considered.

1. WHAT IS SPELLING?—According to Worcester, it is the art of "forming words by arranging their proper letters in due order." But this definition is as loose, and therefore unscientific, on the one hand, as it is popularly true and sufficient on the other. The main issue is bound up in the adjective "proper;" a secondary issue is in the word "letters."

To dispose of the latter, it need only be remembered, that "letters" are but the mechanical devices or symbols by which words are represented to the eye. Any one who can analyze a word into its fonetic elements can

* Proceeding, Vol. xxv, pp. 1 and 18.

spell that word by a synthetic recombining of those elements. And this, in the truest sense, is spelling; for the spoken language is *the language*, while the written language is merely its mechanical representation to the eye.

It is not therefore, primarily, "arranging their *proper letters*" that constitutes the true spelling of words, but the proper arranging of their component sounds. Just so far, then, as the successive letters of the written word represent—and exclusively represent—those successive component sounds of the spoken word, just so far will they be the "proper letters" and the written spelling a proper spelling. That is, in true spelling every symbol should have but one sound, and every sound but one symbol.

2. WHAT IS ENGLISH SPELLING?—By the foregoing amplified definition, it is evident that the great bulk of our English spelling can be so called only by courtesy—only by a deference to a usage that has itself originally deferred to the ignorant printers and proof-readers of by-gone centuries. Orthograpy, in its root sense, can hardly be considered an element of Victorian English.

Indeed, as Lord Lytton well says, "A more lying, round-about, puzzle-headed delusion than that by which we confuse the clear instincts of truth in our accursed system of spelling was never concocted by the father of falsehood. How can a system of education flourish that begins by so monstrous a falsehood, which the sense of hearing suffices to contradict?"

"The greatest genius among grammarians," says Dr. March, "Jacob Grimm, but a few years ago, congratulated the other Europeans that the English had not made the discovery that a whimsical, antiquated orthograpy stood in the way of the universal acceptance of the language."

And why is it a "whimsical, antiquated orthograpy?"

Because, being unphonetic, it is unetymological. "It is the *sound* of the spoken word," says Skeat, "which has to be accounted for, and all symbols which disguise this sound are faulty and worthless. If our old writers had not used a fonetic system, we should have no true data to go by." "We still retain much," says the same author, "of the Elizabethan spelling, which, even at that period, was retrospective, with a Victorian pronunciation. * * * The changes in spelling since 1600 are comparatively trifling, and are chiefly due to the printers who aimed at producing a complete uniformity of spelling, which was practically accomplished shortly before 1700. The changes in pronunciation are great, especially in vowel sounds. * * * The shortest description of modern spelling is to say, that, speaking generally, it represents a Victorian pronunciation of popular words by means of symbols imperfectly adapted to an Elizabethan pronunciation; the symbols themselves being mainly due to the Anglo-French scribes, of the Plantagenet period, whose system was meant to be fonetic. It also aims at suggesting to the eye the original forms of learned words. It is thus governed by two conflicting principles, neither of which, even in its own domain, is consistently carried out."

And again, says Dr. March, "Caxton brought over a force of Dutch printers, who set up manuscripts as best they could, with many an objurgation. People ceased, at last, to feel any necessity for keeping sounds and signs together. The written words have come to be associated with the spoken words as wholes without reference to the sounds which the separate letters would indicate. Changes in the sounds go on without record in the writing. Ingenious etymologists slip in new silent letters as records of history drawn from their imagination. Old monsters propagate themselves in the congenial environment, and altogether we have attained the worst spelling on the planet. And we have been proud of it, and we are fond of it."

The actual condition of things, then, as Meiklejohn (late Asst. Commissioner of the Endowed School Commission for Scotland) puts it, is: Out of the 26 letters, only 8 are true, fixt and permanent qualities—that is, are true both to eye and ear. There are 38 distinct sounds (Sayce recognizes 40, others 32) in our spoken language; and there are about 400 distinct symbols (simple and compound) to represent these 38 sounds. In other words, there are 400 servants to do the work of 38. Of the 26 letters, 15 have acquired a habit of hiding themselves. They are written and printed, but the ear has no account of them; such are *w* in *wrong* and *gh* in *right*. The vowel sounds are printed in different ways; a long *o*, for example, has 13 printed symbols to represent it. And Isaac Pitman shows that in our magnificent tongue, with its wretched orthograpy, the long vowel *a* (in *father*) is represented in 5 different ways; the *a* (in *gate*) in 17 ways; the *ē* has 21 different spellings; the *oa* (in *broad*) is represented by 9 different combinations of letters; the vowel *ō* has 19 modes of representation, and the vowel "oo" (in *smooth*) has 21*. Mr. Ellis gives a list of 97 signs and combinations to express vowel sounds, and having, in all, 319 meanings, or a little more than an average of three meanings to each sign or combination; and, further, he shows that 34 consonant signs have 79 uses.

As a consequence of all this (and more, if we were to stop to discuss it), an enthusiastic fonetist has calculated that the word *scissors* can be correctly spelt in 596,580 different ways, when it ought to be possible to spell it in but *one*, and that one obvious to a child or a foreigner who has never seen it in print nor heard it spelt. In brief, we have, says Prof. Whitney, "a greater discordance between the written and the spoken speech among us than in any other community of equal enlightenment. This is the whole truth; and any attempt to make it appear otherwise savors only of the wisdom of the noted fox who lost his brush in a trap, and wanted to persuade himself and the world that the curtailment was a benefit and a decoration. Every departure from the rule that writing is the handmaid of speech is a dereliction of principle, and an abandonment of advantages which seemed to have been long ago assured to us, by the protracted

* Authorities differ somewhat in these figures. Dr. Thomas Hill places the number of symbols for long *a* (in *gate*) as high as thirty.

labors of many generations of the most gifted races known to history. * * * That the written word in any case deviates from the spoken is a fault which may, indeed, admit of palliation, even amounting to excuse, but which it is an offense against all true science and sound sense to extol as a merit."

Such being the state to which our written speech has come, the natural question to ask is :

3. IS REFORM DESIRABLE?—Such a question is answered in its own asking. Reform or improvement is always desirable in anything. Whether it is possible or feasible is another question. But let us see, briefly, why an improved or reformed spelling would be desirable, by looking at some of the benefits that would accrue from it.

(a) *It would tend toward a greater uniformity in pronunciation.*—Upon this point Whitney says : "So loose and indefinit is now the tie between writing and utterance, that existing differences of utterance hide themselves under cover of an orthograpy which fits them all equally, while others spring up unchecked. No small part of the conservative force expends itself upon the visible form alone ; whereas, if the visible and audible form were more strictly accordant, it would have its effect upon the latter also."

(b) *It would greatly economize time, space, labor, and money.*

"The amount of saving would depend," says Dr. J. H. Gladstone, "very much upon the system adopted. The mere removal of duplicated consonants would save 1.6 per cent, and of the mute *e*'s an additional 4 per cent. In the New Testament, printed in fonetic type in 1849, by Alexander J. Ellis, 100 letters and spaces are represented by 83. As far as printing and paper are concerned, therefore, a six-shilling book would be reduced to five shillings." This is a saving of 17 per cent.

But the question of economy is more far-reaching than we might at first suppose. In the President's address before the American Philological Association, in 1874, he said : "The time lost by it is a large part of the whole school-time of the mass of men. Count the hours that each man wastes in learning to read at school, the hours which he wastes through life from the hindrance to easy reading, the hours wasted at school in learning to spell, the hours spent through life in keeping up and perfecting this knowledge of spelling, in consulting dictionaries—a work that never ends—the hours that he spends in writing silent letters. * * * The cost of printing the silent letters of the English language is to be counted by millions of dollars for each generation. And yet literary amateurs fall in love with these squintings and lispings. They try to defend them by pleading their advantage in the study of etymology. But a changeless orthograpy destroys the material for etymological study, and written records are valuable to the filologist just in proportion as they are accurate records of speech as spoken from year to year." This brings us to the next point.

(c) *If some etymologies would be obscured, more would be evidenced and clarified, none could be lost.*

What is known as the "etymological argument" against spelling reform has been so often and so fully met by the scholars best qualified to speak that it would seem unnecessary to do more than allude to it here. And yet it is sure to be the first objection raised by the person of education, and even of scholarly habit, who has not made specific study of the subject. It is, indeed, at once the most plausible and the most baseless of all objections. Even if all trace of roots were lost from present forms, there would still be no danger of any such sacrifice of linguistic facts. But if none could be lost, so comparatively few would be obscured, while many false etymologies would be disowned, many true ones restored and made plain. This is an established fact among filologists, as will appear from the following, from Max Müller: "An objection often made to spelling reform is that it would utterly destroy the historical or etymological character of the English language. Suppose it did; what then? Language is not made for scholars and etymologists; and if the whole race of English etymologists were really swept away by the introduction of spelling reform, I hope they would be the first to rejoice in sacrificing themselves in so good a cause. But is it really the case that the historical continuity of the English language would be broken by the adoption of fonetic spelling, and that the profession of the etymologist would be gone forever? I say No, most emphatically, to both propositions. Because the Italians write *filosofo*, are they less aware than the English, who write *philosopher*, that they have before them the Latin *philosophus* and the Greek *filosofos*? If we write *f* in *fancy*, why not in *phantom*? If in *frenzy* and *frantic*, why not in *phrenology*? A language which tolerates *vial* for *phial* need not shiver at '*filosofer*.' What people call the etymological consciousness of the speaker is strictly a matter of oratorical sentiment only. If anybody will tell me at what date etymological spelling is to begin, whether at 1500 A. D., or at 1000 A. D., or at 500 A. D., I am willing to discuss the question. Till then, I beg to say, that etymological spelling would play greater havoc in English than fonetic spelling, even if we are to draw a line not more than five hundred years ago. If we write *puny*, *puisne*, we might as well write *post-natus*. We might spell *coy*, *quietus*; *pert*, *apertus*; *priest*, *presbyter*; *master*, *magiater*; *sexton*, *saeristan*, etc." And from Prof. A. H. Sayce: "We are told that to reform our alphabet would destroy the etymologies of our words. Ignorance is the cause of so rash a statement. The science of etymology deals with sounds, not with letters, and no true etymology is possible when we do not know the exact way in which words are pronounced. The whole science of comparative filology is based on the assumption that the ancient Hindus, Greeks, Romans and Goths spelt pretty nearly as they pronounced. English spelling has become a mere series of arbitrary combinations, an embodiment of the wild guesses and etymologies of a pre scientific age, and the hap-hazard caprice of ignorant printers. It is good for little else

but to disguise our language, to hinder education and to suggest false etymologies." And from Henry Sweet: "The notion that the present spelling has an etymological value was quite popular twenty-five years ago. But this view is now entirely abandoned by filologists; only a few half-trained dabblers in the science uphold it."

Testimony of this kind is worth more than a logical array of facts to the average mind, because it adds to the cold fact, the fervor of the personal conviction of those whose convictions are themselves the result of the logic of facts. And just here we cannot do better than quote from Skeat's "The Principles of English Etymology."

"The old spelling was, in the main, very strictly etymological, because it was so *unconsciously*.* In striving to be fonetic, our ancestors kept up the history of words, and recorded, more or less exactly, the changes that took place in them from time to time. But in the sixteenth century an entirely new idea was for the first time started, and probably took its rise from the revival of learning, which introduced the study of Greek, and brought classical words, and with them a classical mode of spelling, to the front; a movement which was assisted by the fact that the spelling was all the while becoming less fonetic. This new idea involved the attempt to be *consciously* etymological; *i. e.*, to reduce the spelling of English words, as far as possible, to an exact conformity in outward appearance with the Latin and Greek words, from which they were borrowed. But it was only possible to do this with a *portion* of the language. It was easy to do this where words were actually borrowed from those languages, as, for example, in the case of such a verb as *to tolerate*, which was now spelt with one *l*, in order to conform it in outward appearance to the Latin *tolerare*. But the words of native English or Scandinavian origin were less tractable; for which reason our writers, wisely enough, let them alone. There remained words of French origin, and these suffered considerably at the hands of the pedants, who were anything but scholars as regarded Old French. For example, the Latin *debita* had become the Old French and Middle English *dette*, by assimilation of the *b* to *t* in the contracted form *deb'ta*, precisely as it became *detta* in Italian. The modern French and the Italian have the forms *dette* and *detta* still. But in the sixteenth century the disease of the so-called 'etymological' spelling had attacked the French language as well as the English, and there was a craze for rendering such etymology *evident to the eye*. Consequently, the Old French *dette* was recast in the form *debte*, and the Middle English *dette* was respelt *debte* or *debt* in the same way. Hence, we actually find in Cotgrave's French dictionary the entry: '*Debte*, a debt.' Another word similarly treated was the Old French and Middle English *doute*; and, accordingly, Cotgrave gives '*Doubte*, a doubt.' The modern French has gone back to the original Old French spellings *dette* and *doute*;

* "Conscious attempts at etymology sometimes produced rather queer results. Thus the M. E. *femele* was turned into *female*, obviously because men fancied it must have some connection with *male*."

but we, in our ignorance, have retained the *b* in *doubt*, in spite of the fact that we do not dare to sound it. The rakers of our orthography, no doubt, trusted, and with some reason, to the popular ignorance of the older and truer spelling, and the event has justified their expectation; for we have continued to insert the *b* in *doubt* and *debt* (properly *dout* and *det*) to the present day, and there is, doubtless, a large majority among us who believe such spellings to be correct. So easy is it for writers to be misled by paying too great a regard to Latin spelling, and so few there are who are likely to take the trouble of ascertaining all the historical facts.

“Most curious of all is the fate of the word *fault*. In Old French and Middle English it is always *faute*; but the sixteenth century turned it into French *faulte*, English *fault*, by the insertion of *l*. For all that, the *l* often remained mute, so that even as late as the time of Pope it was still mute for him, as is shown by his riming it with *ought* (‘Eloisa to Abelard,’ 185; ‘Essay on Man,’ i, 69), with *thought* (‘Essay on Criticism,’ 422; ‘Moral Essays,’ Ep. ii, 73), and with *taught* (‘Moral Essays,’ Ep. ii, 212). But the persistent presentation of the letter *l* to the eye has prevailed at last, and we now invariably sound it in English, whilst in French it has become *faute* once more. The object, no doubt, was to inform us that the French *faute* is ultimately derived from Latin *fallere*; but this does not seem so far beyond the scope of human intelligence that so much pains need have been taken to record the discovery. Another curious falsification is that of the Middle English *vitailles*, Old French *vitailles*, from Latin *victualia*. The not very difficult discovery of the etymology of this word was hailed with such delight that it was at once transformed into French *victailles* and English *victuals*. (See Cotgrave.) For all that, the Middle English *vitailles* was duly shortened, in the pronunciation, to *vittles*, precisely as Middle English *batailles* was shortened to *battles*; and *vittles* it still remains for all practical purposes. Swift, in his ‘Polite Conversation,’ has dared to spell it so; and our comic writers are glad to do the same.

“The form of the word *advance* records a ludicrous error in etymology. The older form was *avance*, in which the prefix *a-* is derived from the French *a* which arose from the Latin *ab*. Unfortunately it was supposed to represent the French *a* which arose from the Latin *ad*, and this Latin *ad* was actually introduced into the written form, after which the *d* came to be sounded. If, then, the prefix *ad-* in *ad-vance* can be said to represent anything, it must be taken to represent a Latin prefix *abd-*! It would be an endless task to make a list of all the similar vagaries of the Tudor remodelers of our spelling, who were doubtless proud of their work and convinced that they were displaying great erudition. Yet their method was extremely incomplete, as it was wholly inconsistent with itself. After reducing the word *tollerate* to *tolerate*, they ought to have altered *follicie* to *folie*, as the latter is the French form; but this they never did. They should likewise have altered *matter* to *mater*, since there is only one *t* in the Latin *materia*; but this they never did. *They had got hold of a*

false principle, and did not attempt to carry it out consistently. So much the better, or our spelling would have been even worse than it is now, which is saying a great deal.

"I believe that the stupidity of the pedantic method which I have just described is very little understood; and that, on the contrary, most Englishmen, owing to an excessive study of the classics as compared with English (the history of which is neglected to an almost incredible and wholly shameless extent), actually sympathize with the pedants. But the error of their attempt will be apparent to any who will take the pains to think the matter over with a little care. Their object was, irrespectively of the sound, to render the etymology obvious, not to the *ear*, but to the *eye*; and hence the modern system of judging of the spelling of words by the *eye only*. There is now only one rule, a rule which is often carefully but foolishly concealed from learners, viz., to go entirely by the *look* of a word, and to spell it as we have *seen* it spelt in books. If we do this we hug ourselves in the belief that we are spelling 'correctly,' a belief which even good scholars entertain.

"Certainly the pedants put several words right, as they thought; but their knowledge was slight. They let the pure English and Scandinavian words alone; and, as we have seen, they mended (as they thought) the spellings of French words, not by comparison with Old French, which might have been justified, but by comparison with Latin and Greek only; and they were frequently misled by the fancy that Latin was derived in its entirety from the Greek. Thus they fancied that the Latin *silva* was derived from the Greek *βλη*, and accordingly altered its spelling to *sylva*. Hence, even in English, we have to commend and immortalize this blunder by writing *sylvan*. They seem to have had a notion that the Latin *stilus* was derived, of all things, from the Greek *στύλος* (a pillar), which would be extremely inconvenient, we must suppose, as a writing implement; the fact being that *stilus* and *στύλος* have no etymological connection. This blunder we commemorate by writing *style*.

"We write *science* because of its connection with the Latin *scientia*; and for this reason some writers of the seventeenth century, struck with the beauty to the eye of the silent *c* after *s*, admiringly copied in such words as *scite*, *scituation* and *scent*. The etymology of the two former was, however, so obvious that the habit fell into disuse; but the etymology of *scent* was less obvious, and so we write *scent* still! What, again, can be more absurd than the final *ue* in the word *tongue*, as if it must needs be conformed to the French *langue*? But when once introduced, it of course remained, because none but scholars of Anglo-Saxon could know its etymology. It is impossible to enumerate all the numerous anomalies which the disastrous attempt to make etymology *visible* has introduced. Yet this is the valueless system which is so much lauded by those who have made no adequate study of the true history of our language."

A long list might be added. For instance, the old *iland* had an *s* inserted because of its supposed derivation from *insula*. Old English *rime*

borrowed an *h* from a supposed Greek original, like *rhythm*, and gave us *rhyme*. The *l* has been inserted in *coude*, to make it like *should* and *would* for which there is a reasonable use of the *l*. Milton's *soveran* (Latin *superanus*) was supposed to have to do with *reigning*, and was so transformed to indicate it, by writing *sovereign*.

Says March : " *Accurse*, earlier *acurse*, from Anglo-Saxon *â*· intensive, and *curse*, simulates by its unfonetic double consonant a Latin origin and the prefix *ad* ; many words are like it : *affair*, French *a-faire*, i. e., *ado* ; *afford*, *a-forth* ; *affright*, from *a-fyrhtan* ; *affray*, past participle correctly *afraid* ; *annoy*, earlier *anoi*, Old French *anoi*, from Latin *in odio*, and so on through the prefixes ; *allegro* is transformed from Latin *alacrum* ; *hurricane*, French *ouragan*, Spanish *huracan*, a word from one of the languages of the aborigines of America, doubles its *r* to persuade etymologists that it *hurries* the *canes*. The double consonants, never correct for pronunciation, are a nest of etymological blunders, and the digraf vowels are as bad. Somewhat different from these sheer blunders are those words in which their unfonetic spelling points to some remote derivation, but yet disguises the history of the words. To follow up the double consonants, a very large part of the apparent compounds of Latin prefixes suggest a mistake. The words are not really Latin compounds, but French. Many with *ad*-, for example, were made in French with the French *a*, and in French and Early English are so spelt. The double consonant is a modern insertion, which falsifies the sound and the history to give the remote school-Latin. Such are *accompany*, Old French *acompaaignier*, compounded of *a* and *compaignier*, to which there is no school-Latin word corresponding ; Early English *acoint*, Latin *cognitus*, disguised now in the form *acquaint* ; *acomplise* ; *acomplish* ; *address*, earlier *adress*, French *adresser* ; *afirm* ; *afix* ; *afront* ; *agrieve* ; *alegeance* ; *alie*, Old French *alier*, alley ; *apease*, French *a pais* ; *apraise*, *a preis* ; *arears* ; *asuage* ; *aturneye*, attorney, etc. These examples, taken from the beginning of the alphabet, may well make the stickler for historical spelling look twice at a double consonant whenever he sees it.

" There are many words which have letters in them which contribute nothing towards ancient history, and falsify the present. Words ending in silent *e* after a short syllable are examples. This *e* tells no history, it is prevailingly an orthografic expedient to denote that the vowel before it is long ; it lengthens *fat* into *fate*, *bit* into *bite*, *fin* into *fine*, *not* into *note*, and the like. Whenever it follows a short vowel, therefore, it is false as well as wasteful : *genuin* is standard English pronunciation, *genuine* is a vulgar corruption ; *hav* spells the word intended, *have* should rime with *gare*, *slare*, *knare*, *rare*, etc. We ought to write *imbecil*, *medicin*, *treatis*, *farorit*, *hypocrit*, *infinit*, *definit*, *indicatio*, *subjunctiv*, and the like. Several hundred words belong to this class, in great part learned terms from Greek or Latin, and common to many languages. To scholars they look more natural and scholarly, as the Germans and most of the Europeans write them, without the final *e*. This is one of the amendments which

gives best promise of general adoption. The Spelling Reform Association publish as one of their rules for immediate use, 'Omit silent *e* after a short vowel,' and five of the eleven new spellings recommended by the Philological Association are examples of it—*definit*, *giv*, *hav*, *infinít*, *lic*. * * * *Feign*, Old English *fein*, *fain*, from Old French *faindre*, has assumed the *g* of Latin *fungo*. * * * *Fonetik* is the very Greek $\varphi\omega\eta\tau\iota\kappa\text{-}\acute{\omicron}\varsigma$, the natural old form of it in Roman letters; $\varphi\acute{\omega}\rho$ is *fur*; $\varphi\acute{\alpha}\nu\alpha\iota$, *furi*; *Fabius*, $\Phi\acute{\alpha}\beta\iota\omega\varsigma$, and the like. But when the Greeklings at Rome began to affect a pure Athenian accent, and retained in words newly taken from Greek the old sound for φ , which had been that of *p* followed by *h*, they wrote *ph* in such words to represent their way of sounding it. The fashion past away at Rome. The Italians, like the Spaniards, have returned to *f*."

"The first question is," says Prof. Max Müller, "in what sense can the present spelling of English be called historical? We have only to go back a very short way in order to see the modern upstart character of what is called historical spelling. We now write *pleasure*, *measure*, and *feather*, but not very long ago, in Spenser's time, these words were spelt *plesure*, *mesure*, *fether*. Tyndale wrote *frute*; the *i* in *fruit* is a mere restoration of the French spelling. * * * The *b* [of *debt*] was likewise reintroduced in *doubt*, but the *p* was not restored in *count* (French *compter*, Latin *computare*), where *p* had at least the same right as *b* in *doubt*. Thus, *receipt* resumes the Latin *p*, but *deceit* does without it. To *deign* keeps the *g*, to *disdain* does without it. * * * If we wish to write historically, we ought to write *salm* instead of *psalm*, for the initial *p* being lost in pronunciation was dropt in writing at a very early time (A. S. *sealm*), and was reintroduced simply to please some ecclesiastical etymologists; also *newew* (French *neveu*) instead of *nephew*, which is both unetymological and unhistorical. * * * There are, in fact, many spellings which would be at the same time more historical and more fonetic. Why write *litttle*, when no one pronounces *litttle*, and when the old spelling was *lytel*? Why *girdle*, when the old spelling was *girdel*? The same rule applies to nearly all words ending in *le*, such as *sickle*, *ladle*, *apple*, etc., where the etymology is completely obscured by the present orthography. Why *ascend*, but *dissent*, when even Milton still wrote *sent*? * * * Why *accede*, *precede*, *secede*, but *exceed*, *proceed*, *succeed*? Why, indeed, except to waste the precious time of children?"

And Dr. James A. H. Murray, the editor of the mammoth new historical Dictionary, says: "Let us recommend the restoration of the historical *t* after breath consonants, which printers during the past century have industriously perverted to *ed*, writing *fetcht*, *blusht*, *pickt*, *dress*, *winkt*, like Shakespeare, and Herbert, and Milton, and Addison, and as we actually do in *lost*, *past*, *left*, *felt*, *meant*, *burnt*, *blest*, *taught*. *Laughed* for *laught* is not a whit less monstrous than *taughed*, *soughed*, would be for *taught*, *sought*; nor is *worked* for *workt* less odious than *wroughed* would be for *wrought*. * * * The termination of the agent *our* should

be uniformly leveled to *or* (which is Old French), as already done in so many words, like *author, doctor, senator, orator* (all of which are adoptions from French, not from *Latin*)."

(d.) *The present so-called spelling is the chief hindrance to education, and a chief cause of illiteracy, ignorance and degradation.*—In his "Introduction to the Science of Language," Prof. Sayce speaks of the "vicious moral training afforded by a system that makes irrational authority the rule of correctness, and a letter represent every other sound than that which it professes." He further remarks that the "dissociation between sound and symbol to which the child has been accustomed from his earliest years, makes the English and the French notoriously the worst linguists in Europe. The inadequacy of English spelling is exceeded only by that of the Gaelic, and in the comparative condition of the Irish and Scotch Gaels on the one side, and the Welsh Cymry on the other, we may read a lesson of the practical effects of disregarding the warnings of science. Welsh is fonetically spelt, the result being that the Welsh, as a rule, are well educated and industrious, and that their language is maintained in full vigor, so that a Welsh child has his wits sharpened and his mind opened by being able to speak two languages, English and Welsh. In Ireland and Scotland, on the contrary, the old language is fast perishing; and the people can neither read nor write, unless it be in English."

The most complete and convincing exhibit upon the educational question is that which has been made by Dr. J. H. Gladstone, F.R.S., member of the School Board for London, and sometime President of the English Spelling Reform Association. Dr. Gladstone's statements are drawn from a thorough investigation of the National, British and Wesleyan schools as well as board schools, and from village schools, town schools and schools of the metropolis. He says: "From these data it is easy to calculate that an average English child, spending eight years in school, and making the not unusual amount of 400 attendances per annum, will have spent on an average 2320 hours in spelling, reading and dictation. * * * The spelling of the Italian language is, as far as I am aware, the most perfect of any in Europe, with the exception, perhaps, of the Spanish. It is, in fact, almost strictly fonetic; that is, each sound is expressed by its own letter, and each letter has but one sound. * * * I have gathered information from different parts of Italy, and fortunately the detailed programs of the instruction in elementary schools are published. From them it appears that children begin school at six or seven years of age, and that while in the first class, which usually occupies two years, they learn to read with a correct pronunciation, and do exercises in transcription and dictation. On passing to the second class they acquire the art of reading fluently and with intelligence, and dictation lessons cease at the end of the first four months. As the summer vacation lasts for two months, and all festivals, both civil and religious, are holidays, the number of attendances can scarcely be greater than 360. As religious instruction and exercises, arithmetic and writing occupy a large proportion of the

five hours *per diem*, ten hours a week may be taken as an outside estimate for learning to read and spell in the first class ; while in the second, reading may occupy five hours, and dictation two and a half hours weekly, but the latter only during the first half of the school year. This will give 945 hours, instead of 2320, and indicates that an Italian child of about nine years of age will read and spell at least as correctly as most English children when they leave school at thirteen, tho the Italian child was two years later in beginning his lessons.

“The spelling of the German language is incomparably better than our own, yet many mute letters are employed, and several sounds are capable of being represented in more ways than one. I have obtained information from educational authorities in various parts of Prussia, Saxony, Wirtemberg, Baden and Hamburg, and that with regard to all classes of society. The German child seems usually to begin his schooling everywhere at six years of age ; and the general testimony is that he learns in two years, if not in a shorter time, to read distinctly and correctly books which are not above his comprehension.”

After giving some details, he continues : “It appears, therefore, that the irregularities of German spelling, trifling as they are when compared with ours, greatly prolong the time required ; yet a German child of ten is about on a par, as to spelling and reading, with our fifth standard children, and is thus saved about two years’ time, tho he commenced to learn later.

“The Dutch, Danish and Swedish languages are spelt better than our own, tho their orthography is by no means perfect. The information which I have received from these countries does not give definit numerical data, but it shows that reading, at least, is acquired more quickly than with us. As to Sweden, I am assured, on the authority of Mr. Ekman, the school board inspector of the Upsala district, that ‘the children in the Swedish board schools as a rule are able to read fluently and to write correctly at the age of nine to ten years.’

“When, however, we turn to France, we find a language which is spelt much more systematically than our own, but has peculiarities which render its orthography almost as difficult. Consequently a very large amount of time has to be expended, as with us, in dictation and transcription. * * * In reply to inquiries as to the comparative time a child ignorant of letters, but understanding English and Italian equally well, would take to learn how to read and write each language correctly, the principal estimated that the English language would require about twice the time of the Italian.

“From inquiries which I have made respecting the Anglo-German schools in London, the general result seems to be that the children acquire as great a proficiency in reading and writing German in eighteen months as they do English in two years. These schools are six in number, and some are in very poor, and some in respectable neighborhoods. My own visits, however, to some of these schools convinced me that not-

withstanding the great attention paid to the English language, the scholars never become nearly as proficient in spelling it as they do in spelling the German. * * *

"If English orthography represented English pronunciation as closely as the Italian does, at least half the time and expense of teaching to read and spell would be saved. This may be taken as 1200 hours in a lifetime, and as more than half a million of money (\$2,500,000) per annum for England and Wales alone."

Various experiments have been made by educators in teaching English spelling by a fonetic alfabet. The results show that children taught in this way acquire the ordinary spelling much more easily afterward. The latest expression upon this point is from the pen of Dr. Thomas Hill, in *The Forum* for April, 1889. He says: "Experience has demonstrated that there is no means so efficient as the use of simple reading-books printed in a truly fonetic manner, so that each sound has but one representative, and each combination of letters but one sound. The accent must also be markt, and in some cases the emphasis. When the pupil can read fluently fonetic English, he requires but a few weeks to learn to read the ordinary spelling."

"Three fundamentally different ways have been proposed of giving to elementary books a fonetic dress. First, by diacritic signs, such as are used in pronouncing dictionaries; secondly, by using an enlarged alfabet; thirdly, by a serious and well-considered imitation of those American humorists who apply the twenty-six Roman letters to a fonetically uniform use. The first method is not only expensive and troublesome to print, but trying to the reader's eyes, and not always applicable without respelling. The second is the mode of the Cincinnati alfabet, and is proposed in a new and improved form in Mr. Bell's World-English. The Cincinnati alfabet was tried long enough and extensively enough to give a practical, experimental demonstration of its immense value. We tested it thoroughly for six or seven years in the town of Waltham, Massachusetts, which then had about 800 children in the public schools. The effect on the school life of the town was very markt. The saving of time in teaching the children to read and spell enabled us to introduce exercises for the eye and the hand, thus cultivating habits of observation, skill in drawing and writing, and geometrical ability. The fonetic print corrected the brogue of the Irish children and the Yankee dialect of the American in a surprising manner. An improvement in the moral and intellectual tone of the schools was also noticeable, arising certainly in part from giving the children interesting reading, in place of stupid 'a, b, ab,' 'b, a, ba,' and instead of such absurd falsehoods as that of saying 'sea,' 'you,' 'pea,' spells 'cup.'

"Fears were exprest lest this method should injure the pupils' spelling. In order to test that question, I took pains to procure, several times, lists of words which had actually been used in Boston, Roxbury, and other places, with the percentage of failures on each list. Springing these lists,

without warning, upon classes of the same grade in Waltham, we always found our percentage of errors very much smaller than in other towns, sometimes I think only one-third as large. We also questioned each pupil in our high-school as to the amount of time which he or she had devoted in his or her whole school life to fonotypy and fonografy. Comparing these times with the percentage of errors in spelling, by the same scholars, we found that those who had read the most fonotype made the fewest mistakes."

One point more. Out of 1972 failures in the English Civil Service examinations, 1866 failed in spelling. The Right Honorable Robert Lowe, formerly Minister of Education in England, challenged the House of Commons that not half a dozen members could spell, off-hand, the word "unparalleled." The Earl of Malmesbury, having examined the State papers in the foreign office, says that no Prime Minister from Lord Bute to Lord Palmerston could pass an examination in spelling.

The foregoing exhibits seem to leave little room for doubt as to the *desirability* of reform. There is, however, one other factor in the discussion of such a theme. Let us call it the personal factor. How do such statements affect the opinion or judgment of men as individuals? Who cares or who has ever cared for, or believed in, the desirability, to say nothing of the possibility, of an amended orthografy?

A few years ago 130 British school boards presented a memorial to the Education Department praying for a Royal Commission in the matter; the British Social Science Association past resolutions favoring reform; the Philological Society of England and the American Philological Association, the Spelling Reform Associations, general and local, have been active in the cause. In 1875, Teachers' Associations of Pennsylvania and New Jersey took favorable action. In July, 1877, the State Teachers' Association of New York appointed a committee to ask the Legislature of that State to create a commission to inquire into the reform, and report how far it may be desirable to adopt amended spelling in the public documents and direct its use in the public schools. The Ohio State Teachers' Association also took action in favor of the reform. In 1878, a memorial was prepared to the Senate and House of Representatives of the United States. This was signed by the president and ex-presidents of the Philological Association, and by filologists and professors in about fifty of our leading universities and colleges. The Department of Public Instruction of the city of Chicago took up the matter, and its Board of Education unanimously adopted a resolution: "That the secretary of this board correspond with the principal school boards and educational associations of the country, with a view to coöperation in the reform of English spelling." Other State teachers' associations and local societies have been similarly emfatic in their expressions. Indeed, any list headed by such names as Müller, Sayce, Skeat, Earle, Murray, Morris, Sweet, Whitney, March, Child, Trumbull, Haldeman, Lounsbury; and by statesmen, scientists, poets, educators, such as Gladstone, Sumner, Mill, Lytton, Tennyson, Trevelyan,

Thirlwall, Bain, Darwin, Lubbock, Harris, Barnard, constitutes "an authority" in English, quite as respectable as The Academy, in French. There is no lack of learned support ; all real *authority* is for the reform. It is the right thing to do, but—

4. IS REFORM FEASIBLE?—First, we must remember that *The written language is not the language*, but merely a device for recording the language, quite within the scope of the reformers as well as the first framers. Secondly, let us see *What has been done in other languages*. To quote again from the valuable report of Dr. Gladstone :

"In the Italian and Spanish languages the spelling has already been brought into almost perfect conformity with the pronunciation. In these, therefore, there is nothing to justify any agitation for further reform.

"Although little fault can be found with the German spelling as compared with the English and French, the educationists of that country and the governments of the different States have long been desirous of simplifying it. In 1854, meetings were held both at Hanover and Leipzig, which resulted in certain modifications of the spelling being rendered obligatory in the Hanoverian higher schools. This was followed in 1860 by Wirtemberg, which adopted a reformed orthograpy for its elementary as well as its upper schools ; and by Austria in 1861, and by Bavaria in 1886. But the changes adopted by these several States are not the same ; and so imminent did the danger appear of having a different mode of writing and printing in different parts of Germany, that a conference of delegates from the several governments was held at Dresden in October, 1872. This led to the Prussian Minister of Education, Dr. Falk, proposing that a competent scholar, Prof. von Raumer, should draw up a scheme ; and this met with the approval of all the governments. The scheme thus prepared was privately printed and sent to the respective governments, and then submitted to a ministerial commission, consisting of Von Raumer and eleven other educationists, together with a printer and a publisher. The commission met in January, 1876, and approved of the scheme with certain modifications ; and a report of the whole proceedings has been drawn up and printed." The reformed spelling is now required to be taught in all the schools, and the military cadets are required to use it in their official correspondence.

"Up to the beginning of the present century, the spelling of the Dutch language was very unsettled. In 1804, the movement for reform assumed a definit shape through the essay of Prof. von Siegenbeek ; and the greatly improved spelling that bears his name was the only official and authorized one till 1873. Then some important changes were proposed by De Vries and Te Winkel, and these are now adopted by the different departments of government. I believe, however, that there are other systems which receive official sanction, and we can only hope that the result will be 'the survival of the fittest.'

“Similar movements for reform are taking place in the Scandinavian kingdoms. The Swedish spelling appears to be about equal in quality to the German, but for the last 100 years, or thereabouts, attempts have been made by competent persons to establish a purely fonetic system, and the Swedish Academy has adopted some of their proposals and embodied them in a model spelling book; but the government has taken no part in the matter, and there is consequently much diversity in practice. In Denmark, the movement originated with Prof. Rask and some other learned men and schoolmasters, and it has resulted in a government decree, confirming certain regulations with respect to double consonants, the silent *e* and *d*, the abolition of *q*, and some other points. These ‘official’ changes are not obligatory; but they are winning their way both in public and private schools. In July, 1869, a meeting of scholars from Sweden, Norway and Denmark took place in Stockholm, with the object of establishing a fonetic mode of spelling which should be common to the Scandinavian languages.”

And there have been and are other similar movements, among the Slavic nations as well as the Romance-speaking peoples, including the French and the Portuguese.

Thirdly, *What has been done already in our own language?* Has any one dared to lay hands on our fetich and lop off a superfluity or restore a lost feature?

The Anglo-Saxon spelling was fairly fonetic, the chief defects being the double use of *f*, the double use of *s* and the ambiguous use of two characters for the two sounds of *th*. In the thirteenth and fourteenth centuries “the English language was practically respelt according to the Anglo-French method, by scribes who were familiar with Anglo-French;” thus, *qu* was substituted for *ew*, *c* for *s* (before *e* and *i*).

It was at this period that Orm, a canon of the order of St. Augustine, wrote “The Ormulum” (1215), which was a set of religious services in meter, spelt according to his own scheme. One peculiarity of Orm’s method was the doubling of the consonant after the short vowel. Orm, or Orminn, may be called our first spelling reformer, and we have to thank him for preserving to us the pronunciation of his day. In 1554, John Hart, of Chester, England, wrote on “The Opening of the unreasonable writing of our english toung: wherin is shewed what necessarill is to be left, and what folowed for the perfect writing thereof.” This the author followed up by a published work in 1569, called “An Orthographie, conteyning the due order and reason, howe to write or painte thimage of mannes voice, most like to the life or nature.” The object of this “is to use as many letters in our writing as we doe voyces or breathes in our speaking, and no more; and never to abuse one for another, and to write as we speake.” In 1568, Sir Thomas Smith, Secretary of State in 1548, and successor of Burleigh, suggested an alfabet of 34 characters. This was followed, in 1580, by William Bullokar’s book in black-letter, proposing an alfabet of 37 characters. Then, too, we must mention Sir John

Cheke, Chaucer and Milton. In 1619, Dr. Gill, head-master of St. Paul's school, published his "Logonomia Anglica," advocating an alphabet of 40 letters. In 1633, the Rev. Charles Butler printed an English grammar phonetically. In 1668, Bishop Wilkins published his great work, the "Essay towards a Real Character and a Philosophical Language," in which he gave the Lord's Prayer and the Creed in a phonetic alphabet of 37 letters. In 1711, says Sayce, "the question of reforming English spelling was once more raised, this time, however, in a practical direction. Dean Swift appealed to the Prime Minister to appoint a commission for the ascertaining, correcting and improving of the English tongue. His appeal, however, was without effect; and the next to apply himself to the subject was Benjamin Franklin, who, in 1768, put forth "A Scheme for a New Alphabet and Reformed Mode of Spelling, with Remarks and Examples concerning the same, and an Enquiry into its Uses."

It would seem that in this Hall, if anywhere, a reform advocated by Franklin is entitled, even at this late day, to a fair hearing and an intelligent understanding. Franklin's scheme, tho in some respects crude, has nevertheless the true ring, and is in many details accurate and scientific. It embraces eight vowels and eighteen consonants. There are special signs for *a* in *ball*, *u* in *gum*, *sh*, *th*, *dh*, *ng*. He considers that the alphabet should be arranged in a more natural manner, beginning with the simple sounds formed by the breath and with no help, or very little, of tongue, teeth, and lips, but produced chiefly in the windpipe. He omits as unnecessary *c*, *g*, *x*, *u*, *y* and *j*; this latter he replaces by a special character which is to follow and modify other consonants; preceded by *d* it produces *j* in *James*; by *t*, *ch* in *chevy*; by *z*, the French *j* in *jamais*. *g* has only its hard sound. There are no superfluous letters, no silent letters. The long vowel is expressed by doubling the short one. There are no diacritical marks. In general principles the scheme is sound. Had Franklin lived in the filological light of the present decade, he would have been a power in the good movement. He went, indeed, so far as to begin the compilation of a dictionary and the casting of the necessary new types. The latter were offered to Webster and declined by him on the ground of the inexpediency of employing new characters. This was in 1768. Eight years later he wrote to a lady: "You need not be concerned in writing to me about your bad spelling; for in my opinion, as our alphabet now stands, the bad spelling, or what is called so, is generally the best, as conforming to the sounds of the letters and of the words."

The next great American reformer was Webster. It would be out of place here to discuss Websterianisms. Suffice it to say that Webster had a lasting influence upon our spelling. Had he been more of a scholar his influence would have been vastly greater than it was. The trouble was that he tried to occupy both ends of the see-saw at once. On one end he sat as etymologist, on the other as analogist. He had "just enough of that half-learning," says Lounsbury, "which enables a man, when he

arrives at correct conclusions, to give wrong reasons for them. Speaking of Webster's orthographic changes, the same writer well says: "At best they merely touch the surface, and then only in a few places. But one effect they have produced. They have in some measure prevented us, and do still prevent us, from falling into the dead level of an unreasoning uniformity. By bringing before us two methods of spelling, they keep open the question of the legitimacy of each, and expose to every unprejudiced investigator the utter shallowness of the argument that opposes change. Slight as these alterations were, however, they met with the bitterest hostility on their introduction."

After Webster come Mitford, Archdeacon Hare, Landor, Pitman, Ellis, and Thomas, and then the mighty host who are leading the present Spelling Reform movement, which includes nearly every eminent English and American scholar. Indeed every one who consciously prefers to spell *parlor, color, music, public, develop, deposit, traveler, jeweler, wagon, woolen, quartet, controller, ake, ax, fantom, program*, proves that spelling reform is popular, and that the people prefer sense to nonsense, brevity to length, economy to waste, truth to falsehood.

The many devices introduced into the written speech during the past six centuries, demonstrate that there is no cast-iron law of language to prevent other devices from being introduced and accepted again.

Because the French scribes of the twelfth century understood that *c* before *e* and *i*, was soft, they substituted *k* for it when the sound was hard. About 1280 the rune "wen" was replaced by *uu*, and afterward by *w*. Accentual marks suddenly disappeared in the thirteenth century. Toward the fourteenth the rune "thorn" was giving way to the use of *th* and *hw* to *wh*—the latter, doubtless, due to the decay of the guttural *h* leaving the sound of *w* more prominent. Indeed, down to the middle of the fourteenth century, *h* had the force of German *ch*. As that decayed in sound, it was reinforced to the eye by a *c* as in *licht, necht*, or by a *g* as in *though*. The symbol *oa* disappeared in the fourteenth, but was revived in the sixteenth century. Another expedient of the fourteenth was to double the final *s* to show that it was not sonant—M. E. *glas, blis, dros*, became *glass, bliss, dross*. Another device for the same purpose was to substitute *ce* as in *mice, twice*, originally *mys, twyës*. Since Shakespeare, useless doubled consonants have given place to a single consonant in words like *pitty, linnen, marriner, widow, pallace*. *Waggon* is now in transition to *wagon*. Duplicate final consonants with final *e* have given place to the single consonant, as *shippe, sonne, farre*. Useless final *e* has been dropt, as in *cheere, drinke, looke*, etc. Three new letters, *j, w, v*, have been introduced.

"About 1630, in opposition to the usage of all past ages," says Dr. Murray, "*u* was made a vowel and *v* a consonant, so that 'Reuiue vs, saue vs from euil,' became 'Revive us, save us from evil.'" Up to that time *u* final was a vowel, but *u* before a vowel was a consonant; when the consonant was written *v* the following *e* was no longer needed to distinguish it. Had the reform gone a little farther and dropt the *e* after the conso-

nant *o* we should have been spared many useless appendages to words like *have, live, etc.*

In the fourteenth century the system of doubling the vowels was resorted to, to indicate length. Since then *ck* has been substituted for *cc* or *kk*, and within memory the *k* has been dropt in words like *music, public, etc.*

Toward the end of the sixteenth century *i* was largely substituted for *y*, so common in Caxton. "In fact," says Skeat, "English abounds with such fonetic devices; no one objects to them so long as they are allowed to remain sporadic, irregular, and inconsistent."

Says Dr. Murray, "The whole history of written language is the record of such gradual and partial reformation. We know, for instance, what was done about 1500 by the systematic application of *ea* and *ee* to distinguish two sounds formerly both exprest by long *e*, and the analogous adoption of *oa* and *oo* for the two sounds of long *o*. And the slightest glance at the orthograpy of Shakespeare, Bunyan, or a Bible of the seventeenth century, will show even the most ignorant, what an immense amount of spelling reform has been done since then. Thus, to take at random a single instance, Psalm 106 (forty-eight verses), as printed in 1611, differs in 116 spellings from that printed in 1879, and the first chapter of Genesis, as now printed, differs in 135 spellings from the same version as printed in 1611. One hundred and thirty-five differences in thirty-one verses! tho the same version word for word. Yet there are people—some certainly fools only, but some I fear knaves—who, when spelling reform is mentioned, shriek, 'You are going to alter our language!' * * * the fools not knowing, and the knaves pretending not to know, that the spelling in which they read these works [Milton, Shakspere, and the Bible] is already a greatly reformed spelling."

Finally, "In 1883," says the report of the State Commission, "a scheme of partial reform was jointly approved by the Philological Society of England and the American Philological Association, and recommended for immediate use. Those changes were made in the interest of etymological and historical truth, and are confined to words which are not much disguised for general readers. * * * Many propositions have been made for adopting part of these changes." * * *

Among these is the progressive scheme used by "The Spelling Reform League," as follows :

1. Use the simplified forms allowed by standard dictionaries, as *program, favor, etc.*
2. Use the Two Words : **tho, thru.**
3. Use the Ten Words : **tho, thru, wisht, catalog, definit, hav, giv, liv, gard, ar.**
4. Use the Two Rules : 1. Use *f* for *ph* sounded as *f*, as in *alfabet, fantom, flososfy, etc.* 2. Use *t* for *d* or *ed* final sounded as *t*, as in *flæt, tipt, stopt, clast, crost, distreat, etc.*

5. Use the Five Rules: 1 and 2 as in 4. 3. Drop *a* from digraf *ea* sounded as short *e*, as in *hed*, *helth*, *sted*, etc. 4. Drop silent *e* final in a short syllable, as in *hav*, *giv*, *liv*, *forbad*, *reptil*, *hostil*, *engin*, *infini*, *oppo*, *sit*, *activ*, etc. 5. When a word ends with a double letter, omit the last, as in *eb*, *ad*, *staf*, *stif*, *stuf*, *eg*, *shal*, *wil*, *tel*, *wel*, *dul*, *lul*, etc.
6. Use the Twenty-four Joint Rules of the American and English Philological Associations.
7. Use all changes recommended by the Philological Associations.

At a meeting of the Philological Society, April 20, 1883, it was voted unanimously to omit certain of the corrections formerly recommended, so as to bring about an agreement between the two societies. The following scheme of partial reform is now jointly approved by the Philological Society of England and the American Philological Association, and is recommended for immediate use :

1. e.—Drop silent *e* when fonetically useless, as in *live*, *vineyard*, *believe*, *bronze*, *single*, *engine*, *granite*, *eaten*, *rained*, etc.
2. ea.—Drop *a* from *ea* having the sound of *e*, as in *feather*, *leather*, *jealous*, etc.
Drop *e* from *ea* having the sound of *a*, as in *heart*, *hearken*, etc.
3. eau.—For *beauty* use the old *beuty*.
4. eo.—Drop *o* from *eo* having the sound of *e*, as in *jeopardy*, *leopard*.
For *yeoman* write *yoman*.
5. i.—Drop *i* of *parliament*.
6. o.—For *o* having the sound of *u* in *but*, write *u* in *above* (*abuv*), *dozen*, *some* (*sum*), *tongue* (*tung*), and the like.
For *women* restore *wimen*.
7. ou.—Drop *o* from *ou* having the sound of *u*, as in *journal*, *nourish*, *trouble*, *rough* (*ruf*), *tough* (*tuf*), and the like.
8. u.—Drop silent *u* after *g* before *a*, and in native English words, as *guarantee*, *guard*, *guess*, *guest*, *guild*, *guilt*, etc.
9. ue.—Drop final *ue* in *apologue*, *catalogue*, etc.; *demagogue*, *pedagogue*, etc.; *league*, *colleague*, *harangue*, *tongue* (*tung*), etc.
10. y.—Spell *rhyme* *rime*.
11. Double consonants may be simplified :
Final *b*, *d*, *g*, *n*, *r*, *t*, *f*, *l*, *z*, as in *ebb*, *add*, *egg*, *inn*, *purr*, *butt*, *bailiff*, *dull*, *buzz*, etc. (not *all*, *hall*).
Medial before another consonant, as *battle*, *ripple*, *written* (*writn*), etc.
Initial unaccented prefixes, and other unaccented syllables, as in *abbreviate*, *accuse*, *affair*, etc., *curvetting*, *traveller*, etc.
12. b.—Drop silent *b* in *bomb*, *-crumb*, *debt*, *doubt*, *dumb*, *lamb*, *limb*, *numb*, *plumb*, *subtle*, *succumb*, *thumb*.
13. c.—Change *c* back to *s* in *cinder*, *expence*, *fierce*, *hence*, *once*, *pence*, *scarce*, *since*, *source*, *thence*, *tierce*, *whence*.

14. ch.—Drop the *h* of *ch* in *chamomile*, *cholera*, *cholera*, *melancholy*, *school*, *stomach*.
Change to *k* in *ache* (ake), *anchor* (anker).
15. d.—Change *d* and *ed* final to *t* when so pronounced, as in *crossed* (crost), *looked* (lookt), etc., unless the *e* affects the preceding sound, as in *chafed*, *chanced*.
16. g.—Drop *g* in *feign*, *foreign*, *sovereign*.
17. gh.—Drop *h* in *aghast*, *burgh*, *ghost*.
Drop *gh* in *haughty*, *though* (tho), *through* (thru).
Change *gh* to *f* where it has that sound, as in *cough*, *enough*, *laughter*, *tough*, etc.
18. l.—Drop *l* in *could*.
19. p.—Drop *p* in *receipt*.
20. s.—Drop *s* in *aisle*, *demesne*, *island*.
Change *s* to *z* in distinctive words, as in *abuse* verb, *house* verb, *rise* verb, etc.
21. sc.—Drop *c*, in *scent*, *scythe* (sithe).
22. tch.—Drop *t*, as in *catch*, *pitch*, *witch*, etc.
23. w.—Drop *w* in *whole*.
24. ph.—Write *f* for *ph*, as in *philosophy*, *sphere*, etc.

“These recommendations are known as the ‘Joint Rules for Amended Spelling,’ or as the ‘Twenty-four Rules.’ They cover the main points as to which there is substantially no further question between the two societies or among reformers in sympathy with them. * * *

“The rules thus derived necessarily differ in importance and in the extent of their application. Some are very comprehensive, some affect only limited classes of words, and some are mere lists of words to be amended. They are arranged in the alphabetical order of the letters omitted or changed. The rules proper may be reduced to 10.

“It should be noted that the rules do not apply to proper names, or to titles or official designations like ‘Philological Association,’ or ‘Phonetic Journal,’ while they may, nevertheless, apply to the individual words which enter into such designations, as *filological*, *fonetic*, *jurnal*.

“There are sufficient reasons against meddling with proper names and titles. They may well be left to adjust themselves to a fonetic standard when such a standard is established for common words.

“The rules for amended spelling form a sequence, in which each degree includes all preceding degrees. The Five Rules include the Eleven Words, and are themselves included in the Twenty-four Rules. The sequence is more gradually developed in the seven steps of the League pledge, according to which one may start, or stop, at any point, from a simple preference for the simplified forms already admitted by the standard dictionaries, to the adoption of all changes recommended by the Philological Associations. The several stages are all consistent with each other, and enable any one who has the spirit of progress in him to exhibit that spirit

in practical action, not only free from the risks of individual preferences or caprice, but with the knowledge that he is acting on the advice and in accordance with the practice of scholars of the highest eminence in English filology."

The report of the State Commission continues: "Without venturing to recommend any of these, or any orthographic novelties, the Commission would call attention to the fact that many words are spelt in two ways in our dictionaries, and that it is therefore necessary for a choice to be made between the different spellings. We find 'honor' and 'honour,' 'traveler' and 'traveller,' 'comptroller' and 'controller,' and hundreds of such pairs. In these words one way of spelling is better than the other on grounds of reason, simpler, more economical, more truthful to sound etymology and scientific law.

"The Commission respectfully submits that the regulation of the orthography of the public documents is of sufficient importance to call for legislative action, and that the public printer be instructed, whenever variant spellings of a word are found in the current dictionaries, to use in the public documents the simpler form which accords with the amended spelling recommended by the joint action of the American Philological Association and English Philological Society."

It is this recommendation of the State Commission that is the objective point of our discussion. Your Committee is unable to see how there can be any difference of opinion upon the following points of the argument:

1. That the English language is grossly misspelt, and is therefore an obstruction to the etymologist; a needless consumer of time, money and energy; a falsifier of history; a perverter of the logical and of the moral faculty; a hindrance to education; a chief cause of illiteracy and a clog upon the wheels of general progress.

2. That either a complete or a partial reform is desirable.

3. That as partial reforms have been successfully wrought in the past and present centuries in English, and complete reforms in other languages, it is feasible to hasten and direct the still further improvement of our so-called orthography.

Your Committee heartily believes, with Prof. W. D. Whitney, that "it is altogether natural and praiseworthy that we should be strongly attached to a time-honored institution, in the possession of which we have grown up, and which we have learned to look upon as a part of the subsisting fabric of our speech; it is natural that we should love even its abuses, and should feel the present inconvenience to ourselves of abandoning it much more keenly than any prospective advantage which may result to us or our successors from such action; that we should therefore look with jealousy upon any one who attempts to change it, questioning narrowly his right to set himself up as its reformer, and the merits of the reform he proposes. But this natural and laudable feeling becomes a mere blind

prejudice, and justly open to ridicule, when it puts on airs, proclaims itself the defender of a great principle, regards inherited modes of spelling as sacred, and frowns upon the fonetist as one who would fain mar the essential beauty and value of the language.”

But your Committee is also of the opinion that a complete or strictly fonetic reform, however valuable it be as an ideal, is as yet impracticable. A limited reform in the right direction, however, is not only practicable, but it has already found a foothold. Just how far this could safely be attempted in the State documents the Committee is not required to say. But it is certain that the recommendation of the Commission is as safely conservative as any recommendation in the direction of true progress could be, and that its adoption would be a wise and easy step toward uniformity and the simplification of English orthograpy.

Your Committee therefore offers the following :

Resolved, That the regulation of the orthograpy of the public documents of this State is of sufficient importance to call for legislative action ; and that this Society approves the recommendation of the State Commission that the public printer be instructed, whenever variant spellings of a word are found in the current dictionaries, to use in the public documents the simpler form which accords with the amended spelling recommended by the joint action of the American Philological Association and the English Philological Society.

In view of the fact that the Legislature will probably not take final action upon the recommendation of the State Commission at the present session, and as the Commission still desires the assistance of this Society, we would respectfully suggest that your Committee be continued with permission to report whenever it may seem desirable.

PATTERSON DUBOIS,
HENRY PHILLIPS, JR.,
JAMES MACALISTER.

The resolutions offered by the Committee were adopted.

The Committee on the *Codex Poinsett* presented a report, stating that the publication of the same was desirable, and laid before the Society estimates for the cost of its reproduction.

The Society ordered that the *Codex* should be published in its Transactions and further continued the same Committee, with request to prepare appropriate letter press to accompany the plates and to superintend the passage of the paper through the press.

Mr. Phillips stated that the *Physa Heterostropha*, of which he had spoken to the Society on April 20, 1888, had reap-

peared in the same place about three weeks since and promised to be very abundant this season.

Oral communications were made as follows :

By Prof. Henry F. Osborn :

1. Upon the Displacement of the Foot-bones in the Mammalia.

2. Upon the Perissodactyla of the Uinta.

By Prof. W. B. Scott :

1. Upon the Relations of the Uinta to the Bridger and White River Fauna.

2. Upon the Artiodactyla of the Uinta.

The question of printing the old minutes of the Board of Officers and Council was deferred until the next stated meeting of the Society.

Pending nominations 1183-1187 were read.

And the Society was adjourned by the President.

Folk-Medicine of the Pennsylvania Germans.

By W. J. Hoffman, M.D., Washington, D. C.

(Read before the American Philosophical Society, May 3, 1889.)

Reverting to the period in the history of Pennsylvania, when the homesteads of the colonists were remote from one another, it may readily be conceived that ordinary social intercourse was impracticable. One of the first duties was considered to be the erection of a house of worship so located as to be accessible to the greatest number of people within a given area. Thus it generally happened that the gatherings before Sunday service were of social importance and were looked forward to with great interest as a means of exchanging the news and incidents of the preceding week. This practice still obtains in the rural districts.

Except in the villages, and larger towns, professional medical services were scarcely to be had, and hence in other than simple cases it was the pastor who was called upon to administer to the bodily as well as to the spiritual welfare of the members of his flock. Common complaints were treated by the application or administration of household remedies, the collection and preparation of which formed no insignificant part of the wife's duties. For this purpose various plants, roots, barks and blossoms

were gathered at specified times, and preserved in special ways, each separately wrapped or inclosed in a small bag, and ultimately suspended from the rafters of the attic ready for use. This custom was not a new one, but merely the perpetuation of a practice transmitted through preceding generations, and the custom survives even at the present day.

Although many of the plants used are well known to possess the therapeutic properties attributed to them, and their selection seems to be based upon sound principles, yet the greater part of them are coupled with some form of superstitious belief, either pertaining to the time of gathering, method of preparation or administration.

There are numerous instances in which certain plants are supposed to possess special virtue in particular diseases, on account of their fancied resemblance to some part, or organ, of the human body; and others again where color plays an important part in their selection.

Among the less intelligent and truly illiterate prevail the practice of laying-on of hands, breathing upon the affected part, charms, incantations, exorcism, making passes with the hands and crosses with the index finger, at the same time pronouncing the name of Jesus and coupling therewith some act in His life; besides various other mysterious actions seemingly for the purpose of impressing the credulous and superstitious. Such practices are still indulged in, and when a patient suffers from an insignificant disorder which in due time disappears, the restoration to health is accredited to the operator and consequently adds to his already established reputation.

The several methods of procedure just mentioned are seldom practiced by the same person. There are individuals of both sexes who become famous for success in special complaints; one may have a specialty in erysipelas and other inflammatory diseases; another may be noted for his success in arresting hemorrhage, and still another may be celebrated as the possessor of a "mad-stone," which is often equally applied to the bites of rabid dogs and venomous serpents.

To another class may be relegated the workers of evil, witches or *hex'a*. In opposition to these, to cure sickness or to remove spells, are a class of sorcerers who work countercharms, frequently employing mystic writings, charms and fumigations. Some of these even go so far as to profess the power of producing good or evil effects upon absent persons, regardless of distance, and in this respect they occupy a position identical with that of the Indian medicine man or shaman.

Another form of cure is by the transference of disease, either to some person or animal or to an inanimate object; sometimes a disease is cast out at a specified time or upon the fulfillment of certain injunctions.

Investigation proves conclusively that some of the superstitions and practices found in Pennsylvania were introduced by the colonists from the countries from which they had emigrated; and it is evident, also, that others of them have become modified, as were deemed necessary, or were changed by the adoption of new methods resulting from a new environ-

ment. One of the chief reasons pertaining to the last-named may be on account of the difference of the flora of Western Europe and that of Pennsylvania.

A number of charms and recipes appear also to have been selected from old works alleged to contain valuable secrets. One of these, known as the "Sixth Book of Moses," is said to be of great value in that it contains formulæ for casting bullets, which never fail to strike the object *thought of*; compelling game to return, before sunset, to the footprint over which the operator pronounces certain mystic words, etc. I have thus far been unable to see a copy of this work, although its possession by certain persons has been reported to me from time to time.

Another purports to be a reprint of a work by Albertus Magnus, a learned philosopher of the thirteenth century, in which are given a large number of formulæ, recipes, charms and other secrets for exorcising evil spirits from man and beast.*

A third work, a copy of which, as in the case of the last named, in the possession of the writer, is unfortunately without title page, and it is only from the introduction of one short article that it becomes apparent that the work was printed in America sometime during the earlier portion of the present century. Much of the information contained in this little volume appears to have been selected from "Albertus Magnus," though there are a number of charms and recipes entirely new, and quite unknown to the people under discussion.

Before detailing some of the methods of procedure in the cure of disease, it may be of interest to note several superstitions pertaining to the indication and prevention of disease, and the avoidance of bad luck.

By many it is still considered a forerunner of illness for one to sneeze, and the usual "helf Gott" or "Amen" is uttered by some one present. This is a very old custom, and Brand† remarks, "In Langley's Abridgment of Polydore Vergil, fol. 130, it is said: 'There was a plague whereby many as they neezed dyed sodeynly, werof it grew into a custome that they that were present when any man neezed should say, "God helpe you." A like deadly plague was sometyne in yawning, wherfore menne used to fence themselves with the signe of the crosse: bothe which customes we reteyne styl at this day.'"

The writer has discovered the survival of a belief—prevalent in many portions of the Old World—in regard to the position of sleeping "north

* Albertus Magnus bewährte und approbirte sympathetische und natürliche egyptische Geheimnisse für Menschen und Vieh. Für Städter und Landleute. Neueste Auflage. In 3 Theilen. Brabant, 1725. sm. 8vo., pp. 71, 84, 70. Although bearing the above date, this is a recent reprint, issued in New York.

Albertus Magnus was born at Lauingen in Bavaria, about 1200. He occupies the first rank among philosophers and theologians of the Middle Ages. He became a Dominican friar in his youth, and lectured later in life both at Paris and Cologne. He died in 1280 and left a great number of works, which treat of logic, theology, physics and metaphysics. Thomas Aquinas was his disciple.

† Popular Antiquities. London, ill, 1882, p. 125.

and south," *i. e.*, having the head end of the bed to the north. Mr. D'Arcy Power* quotes several instances of prominent people who were successful in attaining advanced age upon practicing this method of sleeping themselves, and insuring sleep to invalid children when every other prescription had failed. "A physician who died at Magdeburg, at the advanced age of 109, states in his will the manner in which he preserved his life. 'Assume,' he said, 'as often as convenient, and especially during the hours of sleep, the horizontal position: the head towards the north pole, and the rest of the body in a direction as much as possible that of the meridian. By this means the magnetic currents which pervade the surface of the globe keep up a regular and normal kind of nutrition of the mass of iron contained in the economy; and hence arises the increase of vital principle which regulates all the organic phenomena having a direct action on the preservation of life.'"

Mr. Power, in commenting upon this and similar instances, concludes: "These facts, whether scientifically accurate or not, will suffice to prove that this particular position in sleeping was commonly regarded as the most favorable one possible. We think that many customs of the kind, which are sometimes considered as mere superstitions, may be traced to some underlying truth which affords a more or less sufficient justification of them." †

A common belief is to the effect that if a potato be carried in one's pocket it will secure freedom from rheumatism. In some instances a horse-chestnut is claimed to possess similar properties, and is therefore carried in a similar manner.

If the rattle of a rattlesnake be attached to a string and suspended from the neck, it will prevent, as well as cure, rheumatism.

To carry a bullet in one's pocket will prevent an attack of toothache.

The following, to prevent poisoning from ivy, was given to the writer by a correspondent in Fayette county: "Eat a small portion of the root in the spring, and you will be proof against it during the whole year."

During the prevalence of contagious diseases, sliced onions are exposed in sleeping-rooms in the belief that the infectious matter would be absorbed, and not affect the occupants.

To prevent cramp while bathing, a thong of eel's skin is tied about the leg or wrist.

For the purpose of preparing the system for warm weather, an infusion of the crushed bark of sassafras root is used early in spring. A teacupful is swallowed once, or twice, daily for about one week. Thirty years ago it was a common practice for all elderly people to be bled, or cupped, each spring. The belief was that the blood was sluggish, and an accelerated circulation could only be produced by reducing the quantity in the body.

* The Folk-lore Journal, London, II, 1884, pp. 92, 93; also quoting the Lancet (London), March 3, 1866, and Notes and Queries, December 3, 1870.

† The Folk-lore Journal, Lond., II, 1884, p. 93.

To kill the first snake found in spring will enable one to thwart the evil designs of one's enemies for the remainder of the year.

A very common practice is to nail a horse-shoe against the lintel of the stable door, to insure good luck and safety to the animals. Horse-shoes are also nailed over the doors of the house to insure good luck to the occupants. That such a horse-shoe be found upon the highway is of additional importance.

The custom of employing horse-shoes in the manner above mentioned, and the representation of the outline or impress of a hand, is of Oriental origin. The Romans drove nails into the walls of cottages, as an antidote against the plague: for this reason L. Manlius, A. U. C. 390, was named dictator to drive the nail.* In Jerusalem, a rough representation of a hand is marked by the natives on the wall of every house whilst in building.† The Moors generally, and especially the Arabs of Kairwan, employ the marks on their houses as prophylactics, and similar hand-prints are found in El Baird, near Petra. In Persia, it appears, these hand impressions receive another interpretation so as to become related to an important fact in the history of that people. General A. Houtum-Schindler, Inspector-General of Telegraphs of the Empire, says: "All through Persia, principally in villages though, a rough representation of a hand, or generally the imprint of a right hand, in red, may be seen on the wall or over the door of a house whilst in building, or on the wall of a mosque, booth or other public building. It is probably an ancient custom, although the Persians connect it with Islam and say that the hand represents that of Abbas, a brother of Husain (a grandson of the prophet Mohammed), who was one of the victims at the massacre of Kerbela in A. D. 680, and who had his right hand cut off by el Abrad ibn Shaibân. In India I have noticed similar marks, hands, or simply red streaks."‡

That these practices and the later use of the horse-shoe originated with the rite of the Passover is probable. The blood upon the door-posts and upon the lintel (Exodus xii, 7) was put upon the most conspicuous places and formed, as it were, an arch; and when the horse-shoe was invented it was naturally adopted by the superstitious as conforming to the shape, or outline, upon the primitive doorway, and in time it became the symbol of luck, or "safety to those residing under its protection."§

In the following notes, under head of each disease, are presented the facts pertaining to ailments and their treatment by internal remedies, charms, transference of the complaint, etc.:

AGUE.

The following remedy is reported from Fayette county, where, according to the informant, it is held in high repute: "Take one quart of ale,

* Brand's Antiquities, Lond., iii, 1882, p. 18.

† Lieut. Condor, "Palestine Explor. Fund," Jan., 1873, p. 16.

‡ Letter dated Teheran, Dec. 19, 1888.

§ This has been previously referred to in an article entitled: "Folk-lore of the Pennsylvania Germans," printed in *The Journal of Am. Folk-Lore*, Boston and New York, Vol. 1, No. 2, 1888, p. 129.

put into it nine pieces of burdock root and nine pieces of plantain root, and after dark bury the vessel under the eaves of the house. Take it up next morning before daylight and drink."

BRONCHITIS.

Make a gimlet hole in the door frame at the exact height of the top of the patient's head, into which insert a small tuft of his hair and close the hole with a peg of wood, then cut off the projecting portion of the peg. As the patient grows in height beyond the peg, so will the disease be outgrown.

This has recently been practiced in the case of young boys, but it is not stated what would be the course adopted in the case of an adult, who had attained his full height.

COUGHS ; COLDS.

A common remedy is to put brandy into a saucer and set it on fire. When it has burned several minutes extinguish the flame, by covering the dish, and add sufficient white sugar to make a syrup. The dose is a teaspoonful, taken in intervals of an hour or two, as the case may require.

Peter Kalm* refers to sassafras berries being used, by putting them into rum or brandy, "of which a draught every morning" was taken. "The bark being put into brandy, or boiled in any other liquor, is said not only to ease pectoral diseases, but likewise to be of some service against all internal pains and heat; and it was thought that a decoction of it could stop the dysentery."

The inner bark of the wild cherry tree (as well as the berries) is put into a bottle of whisky or brandy and allowed to stand for a week or more, when small doses of the mixture are taken for cough.

A stocking tied around the head has been used for a cold in the head, and it is probable that this may be a modification of a remedy suggested many years ago.†

CUTS AND WOUNDS.

If cut with a sharp instrument, or tool, grease the cutting edge of the instrument and lay it aside to hasten the cure and to prevent lockjaw. This practice prevailed also in some parts of England, and Mr. Black‡ suggests that the secret lay in the simplicity of non-interference with the wound and treating the instrument instead.

Wounds and bruises are bathed with a tincture of balsam-apple—*Momordica balsamina*—a bottle of which is generally kept on hand for the purpose. When the plant, or vine, has blossomed and the pod begins to grow, a bottle is slipped over it so as to allow the fruit to grow to its full

* Peter Kalm. *En Resa etll Norra Amerca, etc.* Stockholm, 1753, l.

† "Du musst es für gewiss alle Abende thun; wann Du Deine Schuhe und Strümpfe ausziehest, so fahre mit dem Finger durch alle Zähne und rieche daran. Es wird gewiss helfen." From the third-named work *Mittel und Künste* above alluded to.

‡ *Folk-medicine, etc.* Lond., 1853, p. 53.

size within the vessel. When fully ripe, the stem is cut and the bottle filled with whisky or brandy, and after several weeks the liquid is ready for use.

Dog-fat and skunk-fat are both used in certain localities for bruised and incised wounds ; and for the latter, a piece of bacon-fat is also sometimes applied by means of a bandage.

CORNS.

If any one suffering from corns takes a small piece of cotton cloth, rubs it over the offenders and hides it, unobserved, in a coffin with a body about to be buried, the corns will leave him.

CRAMP.

It has already been noted that boys, to prevent having cramp while bathing, tie a thong of eel skin about the leg or wrist ; and when entering the water an additional safeguard is for them to urinate upon their legs.

CROUP.

A common remedy consists of a mixture of goose-grease and molasses, given internally to induce emesis.

One less frequently used is to make a poultice of grated poke-root and vinegar, and applied to the soles of the feet.

In Lehigh county an emetic for this complaint is prepared by boiling three (or five) onions until soft, and mixing the juice therefrom with honey.

In Fayette county an emetic for croup is made by mixing urine and goose-grease and administering internally, and also rubbing some of the mixture over the breast and throat.

DEAFNESS.

This, it is believed, may be successfully treated by dropping rattlesnake oil into the affected ear.

A native "herb doctor," who lives in the Blue mountains of Cumberland county, presented the writer with a card bearing the following recipe: "One ounce of refined camphor oil, the ears of a weasel, a male weasel for a male, is proved and insured, by putting it in cotton in the ears of a man, to cure all deafness."

DIPHTHERIA.

In Fayette county a poultice consisting of the fresh excrement of a hog is worn about the neck for one night.

Cow-dung poultices are also known to have been used for this disease, but more faith is placed in a band of red flannel secured about the neck. There is great faith in the color of the material used ; the general impression prevailing is that all *red* flannel is medicated ; and there appears to be an association of ideas between the color of the flannel and that of the inflamed throat.

DOG BITES; HYDROPHOBIA.

The belief noted by Mr. Phillips,* as current in the vicinity of Philadelphia, obtains in various localities along the eastern base of the Blue mountains: "To cure a bite use a hair of the dog that caused it; it is sometimes placed between two slices of buttered bread and eaten as a sandwich."

In one of the publications already referred to as containing a reference identifying it as an American work,† a remedy for mad dog bites is given in which chickweed forms the subject. This plant must be gathered in June, when it is in full bloom, dried in the shade and powdered. It is taken in the form of powder. The dose for an adult is a small tablespoonful, or by weight, a dram; for children the dose is the same, but it is divided and given at three different times.

One of the most popular fallacies is the surviving belief in the powers of the mad-stone. We frequently read interesting notices in the newspapers of reputed cures, and the prevention of hydrophobia, but there are pretensions also that these stones may be used with equal success in the extraction of serpent venom. In this respect the practice reverts to the custom as first known in Asia Minor, and later in Europe.

Among the various individuals in Pennsylvania who profess ability in exorcism and charms, we occasionally find one who is reputed to possess a mad-stone. These pebbles are of various sizes, and appear to have been selected on account of some peculiarity of color or form. A specimen,

* Proc. Am. Phil. Soc., Philadelphia, Vol. xxv, p. 159.

† *Mittel und Künste*. On account of the peculiarity of the recipe, I append it in the original:

"Ein gewisser Herr Valentin Kettering, von Dauphin County, hat dem Senat von Pennsylvanien ein Mittel bekannt gemacht, welches den Biss wüthender Thiere unfehlbar heilen soll. Er sagt, es sei bei seinen Vorfahren in Deutschland schon vor 250 Jahren, und von ihm selbst, seitdem er sich in den Vereinigten Staaten befindet, welches über 60 Jahre ist, gebraucht, und immer als untrüglich befunden worden. Er macht es blos aus Liebe zur Menschheit bekannt. Dieses Mittel besteht aus dem Kraut, welches er Chickweed nennt—es ist eine Sommer-Pflanze, und bei den Schweizern und Deutschen unter den Namen: Gauchheil, rother Moyer oder rother Hühnerdarm, bekannt. In England nennt man es: rother Pimpernel; und in der Botanik heisst es: *Annagellis Phönicea*. Es muss im Junius, wann es in voller Blüthe ist, gesammelt, im Schatten getrocknet und dann zu Pulver gerieben werden. Hiervon ist die Dosis für eine erwachsene Person, ein kleiner Esslöffel voll, oder an Gewicht ein Drachma, und ein Scrupel auf einmal in Bier oder Wasser; für Kinder ist die Dosis eben so gross; allein es wird zu drei verschiedenen Zeiten gegeben. Wenn es für Thiere grün gebraucht werden soll, so schneide und vermische man es mit Kleie oder andern Futter. Wenn man es Schweinen geben will, so mache man das zu Pulver gemachte Kraut mit Teig zu Kugeln. Man kann es auch auf Butterbrod, mit Honig oder Molasses, etc., essen.

"Ein gewisser ehrwürdiger Herr in diesem Staate sagt, dass man von dem Pulver dieses Krautes in Deutschland 30 Gran schwer des Tages viermal gebe, und so eine Woche lang mit einer geringern Dosis fortfahre, und mit der Brühe dieses gekochten Krautes die Wunde wasche, und auch Pulver hinein streue. Herr Kettering sagt, dass er immer nur eine Dosis mit dem glücklichsten Erfolg gegeben habe.

"Es wird gesagt, dass dies dasselbe Mittel sei, mit welchem der verstorbene Doctor William Stoy so viele Curen verrichtet und glücklich geheilt habe."

which had a high reputation in the State from which it had been brought, was described by the present writer,* as consisting of a worn piece of white feldspar, and possessing none of the properties of absorption attributed to it.

The first notice of stones used in extracting, or expelling, poisons, occurs about the middle of the thirteenth century, though the knowledge of them, and their use, by the superstitious of Asia Minor, without doubt antedates that period. They were called bezoar stones,† and consisted of a calculus, or concretion, found in the intestines of the wild goat of Northern India, known as the Pazan, described by Aldrovandus as *Hircus Pezocardicus*, and which Linnæus mentions as *Capra bezoartica*. Various other ruminants were subsequently found to possess a similar calculus, such as the chamois, and the llama and guanaco furnished the early Spaniards in South America with this highly valued article. The latter was recognized in therapeutics as the Occidental bezoar stone in contradistinction to the Oriental variety, which latter was considered more efficacious. A specimen in the British Museum, described and figured by Van Rymdyk‡ in 1791, is called Bezoar Germanorum, although it had been found in Jamaica.

In addition to the fact that the fable of poison-extracting stones may be traced back to the Middle Ages, it is probable that they had been used long anterior to that time, in Asia Minor, and it is more than probable that a knowledge of their reputed properties, and possibly specimens, were brought back to Europe by Crusaders on their return from the Holy Land.

Several objects found in 1863 at Florence, on the site of the old Church of the Templars, dedicated to St. Paul, are of interest and may be briefly mentioned. One of them is an earthen vase, and another, a medal. These relics are in the collection of M. Gaucia. Lacroix says of these antiquities:§ “The Earthen Vase, on one side of which is seen, between two fleurs-de-lis, the figure of St. Paul bitten by a serpent, bears a Latin|| inscription,

*The Western Lancet, San Francisco, Cal., 1834.

† Known in German as *Bezoarstein* and “*Herr des Giftes*,” Greek, *Alexipharmacum*; Hebrew, *Belazaar* or *Betzaar*; Chaldaic, *Belazaar*, from the Persian *Pâd-Zahr* — *pâd* = expelling, *zahr* = poison.

The medical works of a century ago still mention this substance in its list of remedies, and it was given internally—for a variety of disorders—in combination with other substances, such as powdered red coral, etc. For further information relative to its claims, see inaugural dissertations published as follows: G. Becker. *Lapis bezoar*, Wittebergæ, 1673; J. D. Ehrhardo. *De tinctura bezoardica essentificata*, Jenæ, 1698; J. H. Slevogt. *De lapide bezoar*, Jenæ, 1698; C. W. Vesti. *De lapide bezoardico orientali physice et medicæ considerato*, Erfordiæ [1707].

‡ Museum britannicum, etc., London, M,DCC,XCI, Tab. VI, No. 7.

§ Military and Religious Life in the Middle Ages, and at the Period of the Renaissance. Paul Lacroix, New York, 1874, p. 187, Figs. 148-187.

|| “Expelleo lapide hoc paulli virtute venenvm.”

'In the name of St. Paul, and by this stone, thou shalt drive out poison.' On the other side is engraved in relief the cross of the Temple, between a sword and a serpent. * * * On the Medal is represented a dragon with an Italian* legend signifying, 'The Grace of St. Paul is proof against any poison.'"

In addition to the representation of a dragon, the figure of a scorpion also appears in the space between the beginning and the end of the latter legend.

The fact that St. Paul is the one appealed to in the above cases may be attributed to the fact that he was not affected by the bite of a serpent, when almost instant death was the result expected by his associates (Acts xxviii, 3-6).

EPILEPSY.

The patient must drink the warm blood of a freshly killed dove. It is better if the head be cut-off and the blood taken directly from the neck.

FEBRILE COMPLAINTS.

For ordinary febrile disorders strawberry leaf tea is administered to produce diaphoresis.

Tea made of elder blossoms is given to hasten the eruption in measles and scarlatina.

An infusion made of parsley roots is considered excellent as a diuretic, and to produce free lochial discharge.

Tea made of sheep cherries (*Gen. et sp. ?*) is given for measles.

A decoction of blackberry roots is sometimes given for fever accompanying diarrhoea.

FRECKLES.

To remove freckles from the face, one must rise on the morning of the first day of May, before the sun is up, moisten the hands with the dew upon the grass and wash the face therewith. Not a word must be spoken aloud either before or during this procedure.†

GOITRE.

It is believed that if the hand of a corpse be rubbed over a goitre the afflicted may be certain of recovery.

HYDROPHOBIA. See DOG-BITES.

INCONTINENCE OF URINE.

For children who are affected in this manner, they must be whipped with a *hud'l lum'bu*, i.e., the cloth used in removing ashes from the oven previous to depositing the loaves to be baked.

* Gratia D. S. Pavlo contra tutti Veleni Vivi.

† This custom was indulged in by some of the young people of Hawick, England, to secure "twelve months of rosy cheeks." Folk-lore Journal, Lond., II, 1884, p. 191.

When the patient has reached the age of adolescence, the alleged relief is obtained by urinating into a newly made grave; the corpse must be of the opposite sex to that of the experimenter.

INFLAMED EYES.

Quince seed, soaked in cold water until it is slightly mucilaginous, forms a common remedy for inflamed eyes.

The pith taken from the green branches of sassafras is similarly used.

When the eyes become unusually sore a small piece of bluestone (sulphate of copper) is dissolved in water, and a few drops applied several times daily.

Another common remedy is to put a drop of molasses into the eye and allow it to remain until washed out by the tears.

When sore eyes are accompanied by symptoms of scrofula or other constitutional disorder, the lobes of the ears are punctured and gold rings inserted. This is practiced by men as well as women.

ITCH.

The following is from Fayette county: "Mix equal parts of lard, sulphur, and the inner bark of the alder; heat the mixture, and prepare as an ointment which must be used on three successive mornings, when, on the morning of the fourth day, after careful washing, new clothes must be put on."

The addition of the alder bark is probably on account of some mysterious property attributed to it.

JAUNDICE.

Hollow out a carrot, fill it with the patient's urine and hang it, by means of a string, in the fire place. As the urine is evaporated and the carrot becomes shriveled, the disease will leave the patient. *

In this there is an evident belief in the connection between the properties and color of the carrot and the yellow skin of a patient having jaundice. To this class may belong the belief respecting the use of a band of red flannel for diphtheria, and yellow—or amber—beads for purulent discharge from the ears.

MEASLES.

A patient having the measles is required to remain in a close, warm room, and tea made of elder blossoms is administered at intervals to keep him in a perspiration, to hasten the eruption.

MUMPS.

To cure the mumps, the swollen parts must be rubbed against such parts of a hog-trough as have been worn smooth by that animal.

* Mr. Black records a somewhat similar custom prevailing in Staffordshire, where a bladder is filled with urine and hung near the fire. Folk-Medicine, London, 1883, p. 56.

Here there is apparently a relic of a belief in the transference of disease, of which more will be said further on.

PLEURISY.

To cure pleurisy the child must be passed beneath a table to an assistant.

It is necessary to state, in this connection, that pleurisy is believed to be caused by the attachment of the liver to the ribs; the cure being to rupture this adhesion by stretching the body. This disease is commonly known as liver-grown—*ângewak'sa*, lit., grown fast.

PURGING AND PURGATIVES.

A decoction of the leaves of the bone set—*Eupatorium perfoliatum* L.—although recognized by physicians as a tonic, is used both as an emetic and purgative by the people generally. If the leaves are stripped from the plant in an *upward* manner it is emetic, and if pulled *downward* it is purgative.

The belief in the virtue of the remedy, whether removed from stalk in one direction, or another, survives also with respect to the following:

A decoction of dogwood bark—*Cornus florida* L.—is given as a purgative, as well as to produce emesis; but the desired result depends upon the manner in which the dose has been prepared. The belief pertaining to these effects, the preparation of the bark, and the decoction, is as follows: When the mixture is to act as an *emetic*, the bark is scraped from the branches from *below upward*—when the sap is rising in the spring. This is put into boiling water and a strong decoction made, which, if swallowed, will quickly produce the desired effect. If, however, a *purgative* is wanted, the bark must be scraped *downward*, in autumn, when the sap is believed to *run downward*. The scrapings must be put into a vessel of cold water and boiled for a considerable period of time. If a sufficient quantity be swallowed, purging follows.

That the desired effect is generally attained by adults may appear singular, but it may readily be attributed to the will and action of the patient himself. The decoction, if taken as an emetic, is readily disposed of at the earliest sense of nausea, but when the purpose is to purge, the patient, with some effort on his part, retains the obnoxious mixture until it has passed beyond the control of the stomach into the intestines, when the desired result follows.

A mixture of sulphur and molasses is frequently given to children, to purge, as well as to purify the system, in spring.

Various mixtures are resorted to by adults for the same purpose, to prepare the system for the warm weather and to remove the impurities from the blood, which are supposed to have accumulated during the preceding winter. Should this be neglected one is in danger of having various kinds of eruptions.

Most of the remedies employed for the above purpose contain greater or less quantities of sassafras root, burdock root, bone set, cream of tartar, etc.

RHEUMATISM.

A potato carried in one's pocket will insure freedom from rheumatism. As a potato is perishable and likely to become shriveled, it must be replaced by a fresh one when necessary.

By some persons horse-chestnuts are used in a similar manner.

The rattle of a rattlesnake, attached to a string and worn suspended from the neck, is believed to cure, as well as to prevent, an attack of rheumatism.

Rattlesnake oil, if rubbed over the affected part, is also believed to be an unfailing remedy. The present writer saw this article prepared and offered for sale, only a few months ago, in the mountains of Cumberland county.

A decoction of witch hazel bark is also used as a local application.

A decoction of the bark, or an infusion of the blossoms, of the prickly ash—*Zanthoxylum americanum* Mill.—is also employed in the same manner as the preceding.

SCROFULOUS AFFECTIONS.

Chronic or purulent discharge from the ears is believed to be cured by putting a necklace of yellow or amber beads around the neck of the afflicted one.

In the above-mentioned work—*Mittel und Künste*—is a recipe which has also been found in practice. It is nothing more nor less than a mixture of lime water and oil in such proportions as to become semi-solid, after which it is melted with hog's fat and wax. This is applied daily to the affected limbs, in the form of a plaster.

It has frequently been reported that there are certain persons who are possessed of the power of curing, what is locally termed white swelling, by the laying-on of hands and the recitation of certain secret formulæ. I have as yet not personally met with any one who had such a reputation. The belief may probably be a survival of the older custom of the royal touch. King James II, becoming wearied at such a ceremony, was relieved by merely holding one end of a string while the other, terminating in a loop, was put over the head and neck of each subject presented: in this manner the influence passed from the king's hand to the string, and from the string to the patient's body.

“Kerchiefs dipped in King Charles' blood were found to have as much efficacy in curing the king's evil as had the living touch,”* and “in 1838, failing the royal touch, a few crowns and half-crowns, bearing the effigy of Charles I, were still used in the Shetland islands as remedies for the

* William George Black. *Folk-Medicine*, Lond., 1883, p. 100.

evil. They had been handed down from generation to generation, along, perhaps, with the story which some travelled Shetlander had told of the ceremony on St. John's day, 1633, when Charles I went to the royal chapel in Holyrood, 'and their solemnie offred, and after the offringe heallit 100 persons of the cruellies or kingis eivell, younge and old.' '*

This practice prevailed at different periods and in different countries; and it is only reasonable to suppose that the occasional practice of the laying-on of hands which occurs in this country is nothing but a survival of the English and continental practices; many of the inhabitants of the remote rural districts—as well as some professedly cultured of the literary centres—are in just that plane of development to seize hold of such practice.

SLABBING--IN CHILDREN.

Slabbing is cured, it is alleged, by passing a live fish through the child's mouth. This was practiced in Reading in the summer of 1888, and survives in other localities also.

SNAKE BITES.

As there are many kinds of harmless snakes found in Pennsylvania, and but two venomous species occur there, many of the reputed cures are to be attributed to the fact that many persons are really bitten by harmless kinds. It is a fact too, though perhaps not generally known, that many of the wounds inflicted by rattlesnakes are not fatal. There are a number of reasons for this, chief among which may be noted the condition of the person at the time of the accident, and the time of the year and condition of the serpent—whether much of the poison had lately been discharged or not.

The ordinary treatment is to endeavor to intoxicate the subject with whisky.

In some localities pounded onions and salt are bound over the wound.

Place the vent of a live chicken upon the wound. It is supposed that this has the power of extracting the venom, but it will kill the chicken.

The following practice obtains in Clinton county, among those occupied in picking berries. Rattlesnakes are very common, and the pickers abstain from eating onions, as that seems to accelerate the effects of the venom. If, during the day, one of the number is unfortunately bitten by one of these reptiles, he is immediately taken to the nearest house, where a chicken is secured, cut in two, and the warm bleeding surface of one of the halves placed upon the wound. It is believed that the poison is quickly extracted and no fear as to evil consequences is entertained.

* William George Black. *Folk-Medicine*, Lond., 1883, pp. 142, 143. (Quoted from Pettigrew and Lecky.)

The following formula was practiced by specialists in Northern Lehigh county :

Gott hot al'les ärshaffa, und al'les war güt ;

Als dü al'leⁿ, shlang, bisht ferfucht',

Ferfucht' solsh' du saiⁿ und daiⁿ gift.

† † †
Tsiñg, tsiñg, tsiñg.

Which means :

God created everything, and it was good ; except thou alone, snake, art cursed, cursed shalt *thou* be and thy *poison*.

† Tsiñg, † tsiñg, † tsiñg.

The operator recites the above phrase and then, with the extended index finger, makes the sign of the cross three times over the wound, each time pronouncing the word *tsiñg*. This word is probably meaningless ; though it is possible that it may be a contraction of *tsuñg*—tongue, or *tsiñg''la*, as the rapid movement of a snake's tongue is termed.

A poultice of the bruised roots of the black snakeroot (*Cimicifuga racemosa* Ell.) is also applied to the wound, and a decoction of the same parts of the plant is administered internally. It is generally believed that the blacksnake, when bitten by a rattlesnake, eats of this plant which causes the venom to become inert.

SORE BREASTS.

Warm cow dung is applied as a poultice to sore or gathered breasts. This appears to be used in only one locality, and it is believed that the remedy was suggested by an Irishwoman who was a very energetic advocate thereof. The same substance is used, also, in the south of Hampshire, as an application to open wounds.*

SPRAINS.

Apply a poultice made of yellow clay and vinegar, renewing the application as soon as it gets dry. This is resorted to in Fayette county.

In nearly every district the ordinary application consists of hot vinegar, in which a cloth is dipped, then wrung out, the cloth being used in the form of a bandage.

STINGS OF INSECTS.

“Bind three kinds of weeds upon the spot stung by a bee.” The correspondent who furnishes this, as still practiced in Fayette county, fails to name the plants ; but it appears to partake rather of a charm than a remedy, on account of the use of the number three, which occurs in numerous other instances also.

A silver coin applied to a bee sting is believed to not only remove the pain but to extract the sting.

* Folk-medicine, William George Black, Lond., 1883, p. 161.

Moist clay is also applied by some, in which the moisture and temperature of the substance appears to furnish relief.

To charm a wasp, so that it may be handled without danger of stinging, breathe upon it, and repeat the following words three times without taking breath :

*Wish'bli, wesh'bli, shtech mich nicht,
Bis der Dai'w'l di sē'ga shpricht.*

The equivalent of which is :

Wasp, wasp, sting me not.
Until the devil recites the creed.

STITCHES.

To cure the stitches, pick up a pebble and spit upon it three times, then replace it where found.

STOMATITIS.

Blisters on the tongue of children (stomatitis) are caused by telling fibs. When they show no disposition to leave, the following course is pursued : Three small sticks are cut from the branches of a tree, each of a finger's length and as thick as a leadpencil. These are inserted into the mouth of the patient and then buried in a dunghill ; the next day the operation is repeated with a new set of sticks, and again on the third day, after which the three sets of three each are allowed to remain in the manure, and as they decay the complaint will disappear.

STY.

Rub the sty with a gold ring, and it will disappear. In a similar custom found in West Sussex, England, the sty must be rubbed three times,* and in some known instances it is necessary for the ring to be a wedding ring.

TONSILITIS.

Place a thin slice of bacon fat over the swollen tonsil, and secure it by means of a bandage or handkerchief.

A stocking, turned wrong side out and tied about the neck, will relieve the swelling.

A bandage of red flannel worn about the neck is also looked upon as a good remedy. This is, no doubt, another instance of the belief in the efficacy of color rather than material, as has been noted in the reference to other throat troubles.

WARTS.

Steal a piece of fresh meat—beef being more beneficial—rub it upon the wart and bury it at a cross-road. As the meat decays the wart will disappear.

* The Folk-lore Record, Lond., I, 1878, p. 45.

Tie a horse-hair tightly around a wart and it will leave. This may occur through ulceration.

Shave off the top of a wart and touch the exposed surface with the juice of milkweed—*Asclepias*.

The juice of the common dandelion, if applied to warts at certain intervals, is believed to cause their disappearing in a short time. A number of other plants are also supposed to have this property.

Steal a piece of bacon rind, rub it upon the wart and bury it under the eaves of the house. As the rind decomposes the wart will disappear.

Water from a blacksmith's barrel (in which hot iron is cooled), if applied to warts, will remove them.

Rub the warts with a piece of bone and replace it where found. Whoever picks up the bone subsequently will have the warts transferred to his own hands.

To remove warts or scars, the person so affected must look at the moon and repeat the words :

Was ich raib, nem ab ;
Was ich sën, nem tsü.

The English equivalent is, "What I rub, decrease; What I see, increase." This must be done three nights in succession, beginning before full moon, so that the last trial comes on the night of full moon.*

Another method of a similar character is as follows: Rub the warts with the fingers of the opposite hand, on the first night that the new moon is visible, and recite the following lines :

The moon will increase,
But my warts will decrease.

This must be done unperceived by any one ; and it is believed that before the next new moon all the warts will have disappeared.

A curious procedure consists in frying hens' feet in lard and anointing the warts.

WENS.

To remove a wen, a person must strike it a severe blow with a small Bible. It is apparent that a blow of sufficient strength will rupture the synovial membrane, but the cure is attributed to the influence of the book used.†

* The above appears to be one of the methods adopted in accordance with the following, extracted from *Mittel und Künste*, above referred to, viz. : "Am dritten Tag, im zunehmenden Mond, Abends, wenn du den neuen Mond zum ersten Mal siehst, dann nimm du den Kranken hinaus, lege deine Finger der rechten Hand auf die Warze und blicke nach dem Monde, dann spricht wie folgt : Dasjenige darauf ich sehe ist zunehmend und dasjenige was ich jetzt anfasse ist abnehmend ; nachdem du dieses dreimal wiederholt hast, gehe in das Haus zurück."

† Mr. Székely says wens are caused, it is believed by the Magyars, by trying to count the stars. Folk-lore Journal, Lond., ii, 1884, p. 96.

At some localities, after the blow has been given, a silver coin is placed over the spot and securely fastened with a bandage.

WHOOPIING COUGH.

The following method is pursued in the upper Susquehanna valley : Make a tea of hornets' nests, and allow the patient to drink of it each day. The length of time of continuance is not stated.

Another practice is to administer milk stolen from a neighbor's cow.

One instance of treating a child having the whooping cough consisted of thrusting a live fish into the throat.*

CONJURERS.

Under this caption may be classed all persons professing more than ordinary ability in the cure of the sick or those under spells. They may be of either sex, and are locally termed *blant'sa dok'tor*—herb doctors—and *hex'a dok'tor*—witch doctors. The latter practice various methods of what is generally known as *brauch'a*, which includes powwowing or exorcism, incantation, stroking, etc. It is not always the case that they are called upon to operate directly, but they may communicate a formula or method to the applicant, from whom they receive a fee. Should a remedy be known to one requiring such aid, he first consults the witch doctor both to verify the correctness of his own proposed plan and to conciliate him that no countercharm may be practiced and compel extortionate demands for freedom therefrom.

There are many persons who claim to possess the gift of using the divining rod in the discovery of ores and water. Instances are frequent where wells are sunk after an indication of the presence of water has been ascertained in this way. In fact, it is amusing to learn the particulars of the search, and the ultimate labors of the well-diggers, who continue until they do find water. Naturally, water would have been found under ordinary circumstances, but the rod receives the credit.

Forked sticks of hazel, willow or elm, are generally used for this purpose. One of the Pennsylvania methods is as follows: On Christmas Eve, between the hours of eleven and twelve, the one who intends experimenting must break off a branch that has grown during the year, and, while facing the east, must at the same time speak the name of the Father, Son and Holy Ghost. The rod must be used three times when searching for an object. If the top of the rod inclines toward the ground, the operator is over the spot sought. When using the rod, recite the following words: "Thou Archangel Gabriel, I beseech thee through God, the Almighty, if there is water here, or not, indicate it."

It is supposed that the top of the rod will incline to the front and toward the ground if water is present beneath the surface.

* Notes and Queries. Lond., 5th ser., Vol. ix, p. 64. This was observed near Philadelphia.

If search is made for ore, the name of the kind desired must be mentioned in the above phrase, instead of the word water.

The following directions for selecting a divining rod were given as early as 1751,* at which time the practice of discovering various kinds of ores and water was in vogue. The description is related to have been obtained from "an ingenious gentleman"—not named—who revived the method—which had been greatly neglected—and had made numerous experiments.

"The hazel and willow rods, he has by experience found, will actually answer with all persons in a good state of health, if they are used with moderation, and at some distance of time, and after meals, when the operator is in good spirits.

"The hazel, willow and elm are all attracted by springs of water; some persons have the virtue intermittently, the rod in their hands will attract one half hour and repel the next. * * *

"The best rods are those from the hazel or nut tree, as they are pliant and tough, and cut in the winter months; a shoot that terminates equally forked is to be preferred, about two feet and a half long; but as such a forked rod is rarely to be met with, two single ones of a length and size may be tied together with thread, and they will answer as well as the other. * * *

"The most convenient and handy method of holding the rod is with the palms of the hands turned upwards, and the two ends of the rod coming outwards; the palms should be held horizontally as nearly as possible, the part of the rod in the hand ought to be straight, and not bent backward or forward. * * * The rod ought to be so held, that in its workings the sides may move clear of the little fingers. * * *

"The best manner of carrying the rod is, with the end prolaided in an angle of about 80 degrees from the horizon, as by this method of carrying it the repulsion is more plainly perceived than if it was held perpendicularly. * * *

"It is necessary that the grasp should be steady, for if, when the rod is going, there be the least succussion or counteraction in the hands, though ever so small, it will greatly impair and generally totally prevent its activity, which is not to be done by the mere strength of the grasp, for, provided this be steady, no strength can stop it."

The description continues, embracing directions for using the rod, properties observed, etc., but enough has been quoted to show that the method has not been changed, even up to the present time.

It may be proper to state, however, in further illustration of the form of the rod commonly used, that it resembles the letter Y inverted, thus X , the lower arms being grasped with the hands, and bent horizontally outwards. Thus the stem being carried upright is free to move.

* Gentleman's Magazine, 1751, p. 507. Reprinted also in Gentleman's Magazine Library, Vol. on Popular Superstitions, pp. 148, 149.

TRANSFERENCE OF DISEASE, CHARMS, ETC.

Although the belief in the transference of disease, both to animate and inanimate objects, is prevalent in almost all parts of the world, there are but few instances referred to above that indicate its survival in Pennsylvania. The instances cited pertain to the transference of warts to other persons by means of a piece of bone; the conveyance to the dead, of corns; the transmission to fish, of whooping cough and slabbering of children, and transferring mumps to hogs, through the intermediary of the trough.

The passage under a table, of a pleuritic child, although at present stated to "break up the adhesions," may probably be the relic of an ancient custom in which sufferers from scrofula, hernia, etc., were passed through a cleft tree, or an orifice in rocks, whereby the complaint was lost either by the transmission, or perhaps in the belief of a renewal of life. It was necessary, in most instances, that the body touched the inner surface of these objects, whether tree, or stone, so that the disease was transferred direct.

A tree observed at Burlington, N. J.,* which had been thus split and the parts rejoined, was believed to have been used for such a purpose, and numerous instances might be cited of the practice in England and on the continent. In Ireland, holes in rocks were resorted to for the same end, and it may be that the stone collars found in Porto Rico—some of which are now in the Smithsonian Institution, and the use of which is thus far unknown †—were used by the aborigines in a similar manner. These rings resemble horse-collars, and are slightly varying, on account of which they are known as "rights" and "lefts," the orifice being sometimes rather small, but on the whole could still have been used for passing through it an afflicted child.

Both in France and in England the licking of a wound or sore, by a dog, or the application of a dog's tongue, was firmly believed in as an un-failing cure. This may have originated among the superstitious and had its source in the incident of Lazarus and his affliction.

Diseases are claimed to be cured or removed even at a distance from the operator. Such diseases are said to be the effect of charms and spells put upon patients by witches, or the evil conjuration of those gifted with such alleged powers. The disease may then be due to an evil spirit, or demon,

* Notes and Queries, Lond., 6th ser., 1, p. 16.

† These collars have—for want of a better name—been termed sacrificial stones, but if they had been put to use in the sacrifice or torture of victims, it is scarcely probable that their forms would have been constructed so as to correspond to what is called "rights" and "lefts"; under such circumstances, on the other hand, symmetry would more probably have been an object in their form and outline. An ancient custom was to pass the sick through the sacred *yoni*, and it is apparent that the stone collars much resemble that Oriental symbol.

which has taken possession of the body of the victim, and in this respect the superstition is similar to that entertained by many of the Indian tribes. Countercharms are resorted to for cures, but for this purpose an article of clothing of the person causing the spell, a hair or a piece of finger-nail, must first be secured before the remedial process of exorcism can be attempted by those professing such powers. Imaginary ailments are thus readily removed by conjurers, in whom the victims have faith and confidence.

There is a prevailing belief, also, that some witches have the power of producing peculiar noises in a house, or some other place, to notify certain persons that wrongs are being, or have been, committed by some one intimately connected. The following incident occurred in 1876, and came under the writer's personal observation while he was practicing his profession in the city of Reading :

A farmer, living in the south-eastern part of Berks county, called one autumn day and stated that he had been very much annoyed by peculiar rappings near, or in, his kitchen stove every time he sat down to his meals. He stated furthermore that he suspected his wife of infidelity, as the railroad watchman, whose station was but a few rods from his house, appeared very fond of calling in the evening and at other times when not on duty. The visitor desired to obtain some "witch medicine" so as to compel this man to remain away as well as to put an end to the rappings. He was informed that the noises undoubtedly proceeded from the stove, as after each meal the fire was permitted to go down, or perhaps out, and in consequence the contraction of the several metal parts caused the cracking sounds, as the same noise might be noticed by him had he been at home when the fires were kindled. The simplest explanation of the results of expansion and contraction, failed to penetrate his mind, so, after leaving the office, he proceeded to visit a "quack," who was reputed to be a *hex'a dok'tor*, where he received some charms and vile smelling herbs, which he was directed to burn in his house so as to drive out the evil and remove the visitor.

The result was not ascertained, but the writer has no doubt that the experiment was successful, as any one with normally constituted olfactories would avoid a house where such a stench repeatedly greeted his visits.

The powers attributed to a seventh son are well known, and a woman who marries but does not change her name is also believed to possess unusual skill and power in curing. One such person, living in the above-mentioned county, is frequently called upon by people from a distance, who solicit aid in relief from illness. Her method is both by *stroking*, or laying-on of hands, and by sending cakes of a peculiar kind, which the afflicted are to eat.

A curious circumstance pertaining to a charm intended to attract the affections of the opposite sex toward the operator may be mentioned, although it is not one of the most elegant methods of love-making. A

widow became impressed with a boatman with whom she casually became acquainted, and as he evinced no response to her numerous manifestations of regard, she adopted the following method *to compel him to love her even against his will*. With the blade of a penknife she scraped her knee until she had secured a slight quantity of the cuticle, baked it in a specially prepared cake and sent it to him, though with what result is not known. This woman was known to have had the utmost faith in the charm.

Another class of conjurers direct their attention to the cure of sick and bewitched cattle and other domestic animals; to casting "lucky bullets;" furnishing charms to prevent another man from firing off a gun, usually termed "stealing fire" or "taking fire;" giving charms to prevent dogs from barking, or biting, etc.

It is true that any one acquainted with these methods may himself practice them, but in some there is more certainty of success, it is alleged, if an adept first apply to a recognized conjurer for verification of the method or procedure, otherwise such conjurer, if slighted, might place a counter-charm in the way of success.

As already intimated, witches are supposed to possess abilities in curing the sick, and such as may have been charmed by other witches and conjurers; but there is a belief, also, that some of these beings have the power of transforming themselves, and their victims, into other animals. The following instance is said to have occurred in Northern Lehigh county, many years ago:* A vicious black sow was frequently encountered by people on the highway, but no one knew to whom the animal belonged. One day, as the sow became too aggressive in pursuit of her victim, the person thus annoyed picked up a heavy piece of wood and threw it, breaking one of the animal's legs. It was learned subsequently that a witch living in that neighborhood had broken her leg on the same day and at the same hour, and it was firmly believed that the witch and the animal—which was never encountered afterwards—were one and the same.

The following is a similar instance of alleged transformation caused by a witch, and although the circumstance is said to have occurred during the early part of the present century, it is still mentioned as inexplicable and supernatural by the present residents. The story, in brief, is as follows: † Near Trexlertown, Lehigh county, dwelt a farmer named Weiler. His wife and three daughters had, by some means or other, incurred the enmity of a witch who lived but a short distance away, when the latter, it is supposed, took her revenge in the following manner. Whenever visitors came to the Weiler residence, the girls, without any premonition whatever, would suddenly be changed into snakes, and after crawling back and forth along the top ridge of the wainscoting for several min-

* Reported by the writer in *Journal Am. Folk-lore*, Boston and N. Y., II, 1889, p. 32.

† *J. Am. Folk-lore*, *cit. sup.*, p. 33. Reported by the present writer.

utes they were restored to their natural form. These curious transformations occurred quite frequently, and the circumstance soon attained widespread notoriety. About the end of the third month the spell was broken and everything went on as before.

Witches may be disabled or their charms counteracted by securing a hair from the head, wrapping it in a piece of paper, and, after placing this against the trunk of a tree, firing a silver bullet into it.

Another countercharm to free enchanted or bewitched cattle is to place fire near enough to the victim, the influence being immediately overpowered, as witches are supposed to be unable to bear such close contact of heat, either near their own person or the object under their influence. This is illustrated in the following narrative, and the circumstance occurred only a few years ago, according to report : * A farmer, now living at Alburdis, Lehigh county, had two cows. One day an old woman, who lived but a short distance away, and who was suspected of being a witch, came to the house, and, during the course of conversation, asked which of the cows gave the greater quantity of milk. The one indicated was then with calf. Upon the following day the cows were driven, as usual, into the fields to pasture, but, on attempting to drive them home, later in the day, the milch cow was found lying helpless upon the ground. The farmer, upon hearing of this, went into the field with his sons, to endeavor to get the animal upon her feet. The sons took hold of the horns while the father grasped the tail, but all attempts to move the cow were ineffectual. The father then directed the boys to gather some wood to make a fire, which was soon placed near the cow. During all this time the witch was standing on the portico of the farmer's house, watching the proceedings ; but the instant she saw that fire was to be kindled, she came forward and inquired after the purpose of the proceedings. The farmer accused her of bewitching the cow, but this she denied most vigorously. The witch then bade the farmer call his wife, who, upon her arrival, was told to take hold of the cow's tail while the witch went to the head. After a few caresses and the utterance of some words of endearment and encouragement, the cow rose from the ground and walked away as if nothing had occurred.

The following notice of the trial of witches is reproduced from the *Gentleman's Magazine*, † and relates to a circumstance which transpired in New Jersey, just across the Delaware river. It is probable that the trial was instigated by English residents, as such prosecutions were rare among the German settlers ; in fact, but one instance is known to the writer, to which reference will be made further on. The trial above referred to is given in the following words : " From Burlington, in Pensilvania, 't is advised that the owners of several cattle, believing them to be bewitched, caused some suspected men and women to be taken up, and trials to be made for detecting 'em. About three hundred people assembled near the Gover-

* Related by the writer in J. Am. Folk-lore, Boston and New York, i, 1888, pp. 134, 135.

† January, 1781, i, p. 29.

nor's house, and, a pair of scales being erected, the suspected persons were each weighed against a large Bible, but all of them outweighing it; the accused were then tied head and feet together, and put into a river, on supposition that if they swam they must be guilty. This they offered to undergo in case the accuser should be served in the like manner; which being done, they all swam very buoyant, and cleared the accuser."

The other trial above referred to is related as follows: * "In the southern part of Williams township, Northampton county, there is a hill, to which the witches have left their evil name and fame. It is known as 'Der Hexenkopf,' or 'the Witches' Head,' because it was there that their ladyships were supposed to hold nightly revels. On these occasions they bewitched their neighbors' cattle, and made themselves generally hateful to all good, order-loving citizens. They did not, however, always escape with impunity, as is proved by the following indictment, which is carefully transcribed from the Session Docket, omitting only names and date. The case was 'for bewitching a horse whereby he became wasted and became worse.'

"The jurors do upon their oaths, present, — That S—— B—— of William township, in the county of Northampton, widow, on the — day of —— in the year —— at the said county of Northampton aforesaid, did commit certain most wicked acts (called enchantments and charms), at the county aforesaid, maliciously and diabolically against a certain white horse of the value of £4, of the goods and chattels of a certain Justice W—— of William township aforesaid, on the day aforesaid, and county aforesaid then being, did exercise and practice, by means of which the said horse of the said Justice W——, on the day aforesaid at the township of Williams aforesaid, greatly *worstended (pejoratus est)* and wasted away, against the peace of our said Commonwealth, and against the laws in this case made and provided.'" * * * "Judgment: a year's imprisonment, and every quarter to stand six hours in the pillory."

"The poor woman at first resolutely denied the charge; but the learned judges at last convinced her of her guilt, and she always confessed herself a witch, though she was unable to say in what manner her enchantments had been performed."

* The Historical Magazine, N. Y., vii, 1863, p. 233; reprinted from the *Lutheran*, under the title of *Gleanings of an Antiquarian in German Pennsylvania*.

APRIL 19, being Good Friday, a public holiday in Pennsylvania, no meeting of the Society was held.

Stated Meeting, May 3, 1889.

Present, 16 members.

President, Mr. FRALEY, in the Chair.

Correspondence was submitted as follows:

A circular from the R. Academia delle Scienze, of Turin, soliciting subscriptions for a monument to the late Angelo Genocchi.

A circular from the New Haven Colony Historical Society, stating that a valuable sword presented to the late Admiral Foote, U. S. N., had been stolen.

Circular from the Rhode Island Historical Society, in reference to Indian names and localities in that State.

Program of prizes to be awarded by the Académie Royale de Belgique for 1890.

Letters from August Neilson, Gefle, Sweden, in relation to a proposed international language.

Accessions to the Library were announced from the Geological Survey of India, Calcutta; Physiologische Gesellschaft, Berlin; Naturwissenschaftliche Gesellschaft "Isis," Dresden; Université Royale, Lund, Sweden; Société Zoologique de France, Paris; Société d'Histoire et d'Archéologie, Geneva, Switzerland; Bath and West of England Society; Mr. P. Hoinix, London; New Hampshire Historical Society, Concord; Massachusetts Historical Society, Rev. P. S. Moxen, Boston; Harvard College Observatory, Cambridge, Mass.; Dr. T. H. Safford, Williamstown, Mass.; American Antiquarian Society, Worcester, Mass.; New York State Library, University of the State of New York, Commissioners of the State Reservation at Niagara, Albany; Mr. W. J. Potts, Camden, N. J.; New Jersey Historical Society, Newark; Prof. John Eyer- man, Easton, Pa.; Indian Rights' Association, Historical Society of Pennsylvania, Messrs. Richard B. Osborne, Henry

Phillips, Jr., Philadelphia; Department of the Interior, War Department, U. S. Commission of Fish and Fisheries, U. S. Geological Survey, Washington; Col. Charles C. Jones, Augusta, Ga.; Prof. John C. Branner, Little Rock, Ark.; University of Michigan, Ann Arbor; Historical Society, Chicago, Ill.; Academy of Natural Sciences, Davenport, Ia.; Washington College, Topeka, Kans.; University of California, Sacramento, Cal.; Imperial Observatorio, Rio de Janeiro, Brazil.

An obituary notice of Dr. N. A. Randolph was read, by appointment, by Dr. Joseph T. Rothrock.

The deaths of the following members were announced:

Henry W. Field, London, d. March, 1888.

Prof. Samuel W. Gross, M.D. (Philadelphia), b. February 4, 1837, d. April 16, 1889.

William Henry Rawle (Philadelphia), b. August 19, 1823, d. April 19, 1889.

F. A. P. Barnard (New York City, N. Y.), b. May 19, 1815, d. April 27, 1889.

On motion, the President was authorized to appoint suitable persons to prepare the usual obituary notices of Dr. Gross and Mr. Rawle.

The Secretaries presented a communication from Dr. W. J. Hoffman, Washington, D. C., on the "Folk-Medicine of the Pennsylvania Germans."

The Secretaries presented a paper by Mr. James Mooney, Washington, on "The Holiday Customs of Ireland."

Prof. E. D. Cope made a communication, "A Review of the N. A. Species of Hippotherium."

Prof. Cope made an oral communication as to "The Partial Results of the Geological Survey of the Cypress Hills, near the Saskatchewan River, in the Dominion of Canada."

Dr. Allen made some remarks upon the "Characteristics of the American Pronghorn."

Pending nominations 1183-1187 were read.

The Librarian reported the preparation of a first list of the lacunæ on the shelves of the Society's Library among

sets of publications of various learned societies. On motion, it was ordered to be printed and distributed.

A communication was read from Col. F. M. Etting in reference to the MS. copy of the Declaration of Independence in the autograph of Thomas Jefferson, owned by the Society.

On motion, the Society resolved to publish the same in *fac simile*, and requested Col. Etting to prepare suitable letter-press to accompany the reproduction.

The consideration of the publication of the old Records of the Council was postponed until the autumn.

Prof. Cope offered the following resolution:

Resolved, That the Secretaries see that there are printed on the separata issued to the contributors to the publications of the Society, the name of the publication from which they are taken, and the date at which they are issued to the author. And that both be placed on the sheets of the separata and not alone on the cover.

Mr. Wood moved to refer the motion to the Committee on Publication, and being put to a vote, the motion was declared carried.

And the Society was adjourned by the President.

Stated Meeting, May 17, 1889.

Present, 22 members.

President, Mr. FRALEY, in the Chair.

Correspondence was submitted as follows:

Program of the award of the Hoeufft prizes, by the R. Netherlandish Academy.

A letter from August Neilson, Gefle, Sweden, in relation to international language.

A communication from the "American Anthropologist," requesting a subscription, was referred to the Library Committee with power to act.

The Academie des Sciences at Cracow was ordered to receive Proceedings from No. 130.

On motion, the Tokyo (Japan) Library was placed on the exchange list, to receive Proceedings from No. 96, and a copy of the Catalog.

Letters of envoy were received from the Université Royale, Lund, Sweden; Bath and West of England Society, Bath, Eng.; Bureau des Longitudes, Paris, France; Meteorological Office, London, Eng.; Smithsonian Institution, Department of the Interior, Washington, D. C.

Letters of acknowledgment of 127 were received from Capt. Richard Temple, Mandalay, Upper Burma; Université Royale, Lund, Sweden; Musée Royale d'Histoire Naturelle de Belgique, Bruxelles; Observatorio Meteorologico-Magnetico, Central Mexico, Mex.; Observatorio Astronómico Nacional Mexicano, Tacubaya.

Letters of acknowledgment of 128 were received from the Musée Royale d'Histoire Naturelle de Belgique, Bruxelles; K. K. Central-Anstalt für Meteorologie und Erdmagnetismus, Dr. Aristides Brezina, Vienna; K. Bibliothek, Deutsche Geologische Gesellschaft, Berlin; Naturwissenschaftliche Verein, Bremen; Verein für Erdkunde, Dresden; Verein für Geographie und Statistik, Frankfurt-am-Main; Naturhistorische Gesellschaft, Hanover; Dr. Otto Böhtlingk, Julius Platzmann, Leipsic; R. Accademia dei Lincei, Roma; Station Séricicole, Montpellier; Profs. A. Daubrée, Abel Hovelacque, Gaston Planté, Remi Siméon, Paris; Prof. Lucien Adam, Rennes; Cambridge Philosophical Society, University Library, Cambridge, Eng.; Royal Society, Royal Institution, Royal Astronomical and Meteorological Societies, Society of Antiquaries, Society of Arts, Victoria Institute, Geological Societies, Sir John Lubbock, Sir Henry Thompson, Prof. William Crookes, London; Natural History Society, Newcastle-on-Tyne, Eng.; Penzance Natural History and Antiquarian Society, Plymouth, Eng.; Royal Society of Edinburgh; Royal Observatory, Mr. James Geikie, Edinburgh, Royal Dublin Society, Dublin; Museum of Comparative Zoölogy, Cam-

bridge, Mass.; Messrs. Richard L. Ashhurst, G. de B. Keim, Philadelphia, Pa.; U. S. Coast and Geodetic Survey, Prof. S. F. Emmons, Gen. M. C. Meigs, Washington, D. C.; University of Tennessee, Knoxville; Observatorio Astronómico Nacional Mexicano, Tacubaya.

Accessions to the Library were announced from the Société Finno-ougrienne, Helsingfors; Naturforschende Gesellschaft, Emden; Académie des Sciences, Dijon; Société d'Anthropologie, Musée Guimet, Société des Antiquaires de France, Bureau des Longitudes, Paris; Sociedade de Geographia, Lisbon; Meteorological Council, London; Museum of Comparative Zoölogy, Harvard College Observatory, Cambridge, Mass.; Free Public Library, New Bedford, Mass.; Buffalo Library, Buffalo, N. Y.; Mr. W. J. Potts, Camden, N. J.; Prof. Geo. H. Cook, New Brunswick, N. J.; Mr. Henry Phillips, Jr., Philadelphia, Pa.; Women's Anthropological Society of America, Washington, D. C.; State Historical Society of Wisconsin, Madison; Mr. Charles R. Keyes, Burlington, Ia.

The following communications were offered for the Transactions of the Society by Prof. Scott:

"On the Mammalia of the Uinta Formation," which was referred to Messrs. Horn, Cope and Ryder, to examine.

Subsequently the Committee reported in favor of its publication, and it was referred to the Committee on Publication, with power to act.

The following communications were offered for the Proceedings of the Society:

Through the Secretaries, from Prof. D. S. Kirkwood, Bloomington, Ind., on "The Inclination of the Asteroids."

Mr. Vaux offered, by title, a paper on "The Circle and Cross Symbols."

The Curators reported upon the condition of the cabinets of the Society, and, upon motion, it was ordered that a sum not to exceed one hundred dollars (\$100) be placed at their disposal to enable them to examine and to arrange the same.

The Committee on Hall presented the following report, and resolution, which was unanimously adopted :

PHILADELPHIA, May 17, 1889.

To the President, Officers and Members of the American Philosophical Society :

GENTLEMEN : In view of the fact that the building which the American Philosophical Society now uses was occupied by it for the first time on November 21, 1789, we suggest the adoption of the following resolution :

Resolved, That a proper commemorative celebration of the Centennial Anniversary of its occupancy be held on November 21, 1889 ; the subject and order of exercises to be referred to a Special Committee of six members, with power to take action in the matter.

(Signed)

J. SERGEANT PRICE,
WILLIAM A. INGHAM,
CHARLES A. OLIVER,
Hall Committee.

On motion, the President was authorized to appoint the Committee, which he did as follows: Messrs. J. Sergeant Price, William A. Ingham, Charles A. Oliver, Richard Vaux, Dr. Ruschenberger and Henry Phillips, Jr.

The minutes of the Board of Officers and Council were submitted.

This being the stated evening for the voting for candidates for membership, pending nominations Nos. 1183, 1185, 1186 and 1187 were read, spoken to and balloted for.

Pending nomination No. 1184, in the absence of its proposers, was postponed until October 18, 1889.

The Tellers appointed to receive the votes of the Society reported the result of the balloting to the President, who declared the following persons had been duly elected members, viz.:

No. 2156. Lester F. Ward, Washington, D. C.

No. 2157. Andrew A. Blair, Philadelphia.

No. 2158. Clarence H. Clark, Philadelphia.

No. 2159. Henry D. Gregory, Philadelphia.

And the Society was adjourned by the President.

Biographical Sketch of the Late Nathaniel Archer Randolph, M.D.

By J. T. Rothrock, M.D.

(Read before the American Philosophical Society, May 3, 1889.)

It is not unusual to find men, young and old, who have lived with so clear a conscience that they have few regrets and no fears when the supreme hour of their earthly career comes. It is also very certain that these men leave behind them vacancies which are hard to fill, and that those who knew them best mourn their departure most.

When a young man, jealous of his integrity, conscious of his powers, devoted to the work and welfare of the world, is unexpectedly snatched away after years of preparation, it is but natural that we should regard our loss as almost beyond repair.

We, to-night, deplore the removal from our midst by death of just such a man. Lest it should be supposed that this is the expression merely of an overfriendly opinion, I shall reinforce what I have said by the further statement that Doctor Randolph was both a positive and a popular man; to have been both is so remarkable that it presupposes some extraordinary qualities, which are not often combined in one individual.

Nathaniel Archer, son of Nathaniel and Eliza S. Randolph (now Eliza S. Turner), was born November 7, 1858, after the death of his father. From his earliest childhood he appears to have been conscientious beyond the measure of most boys. To illustrate the above statement: on one occasion, he refused to say, I will be glad to see another child, because, said he, how can I be glad to see one whom I do not even know? With most persons a fondness for natural history, or a special branch of it, can be traced to a particular influence. So far as we can see, this was not the case with young Randolph. He grew up with it, and no more wondered at his mental preferences, or thought of questioning their validity or importance than why he should eat or sleep. His fondness for living things was as decided as was his power of making friends with them. It is said by those who knew him best, that later in life, in his physiological experiments, he was scrupulously careful to reduce suffering to a minimum and never to inflict it at all, save with a clearly defined purpose in view.

His tastes are thus seen to have been naturally those of a student and an observer. Young Randolph rather avoided than courted the manly sports which most boys admire. In fact, it is said by one who had abundant opportunity for knowing, that he did not incline to enough exercise to keep him in the best physical condition. This, however, was due to no lack of spirit, but because he preferred to study, or to amuse himself, in a quieter way. His disposition was gentle; hence, it was an exceedingly rare thing for him to utter a harsh word against any one. This was so true that even his most familiar friends, to whom he confided most of his

likes and dislikes, more than once remarked that he seldom spoke unkindly of his acquaintances or associates.

Dr. Randolph's education was commenced in Philadelphia. Later, he was sent to Swarthmore College, near Media, in Pennsylvania. When seventeen years of age, he entered Cornell University, at Ithaca, in New York; where, while yet a freshman, he contended for and secured one of the prizes that previously none but seniors had entered the list to compete for.

In the spring of 1882, he graduated in medicine at the University of Pennsylvania. His thesis on the "Red Blood Corpuscles" grew mainly out of study in Europe.

With his graduation in medicine his active public career may be said to have commenced. From the very start, his course as a teacher seems to have been predestined. The ink on his diploma was scarcely dry before we find him one of the members of a "quiz," fitting candidates for their final medical examinations. This never degenerated with him into a mere perfunctory performance, in return for fees already collected. He gave in addition to the ordinary "quiz" collateral lectures, in which the fluency and apt illustration, characteristic of the born teacher, were constantly recognized. It is but just to add that the interest and enthusiasm of the teacher reacted upon the class. Many a thirst for knowledge is blunted, depraved and at last quenched by some wretched substitute, simply because the teacher failed to reach a pure fountain head. In the long run, just how many wastes, dry and unproductive, our social life may reveal in consequence, it would be very hard to estimate. Randolph's zeal was an inspiration to his students. This, with his sound judgment, drew students to him and attached them to his own special line of work. This, though not itself genius, is so often associated with it that it is apt to pass for the greater quality. His popularity with his students was so great that an expressed wish from him was seldom, if ever, violated.

His earliest recognized instruction, under University control, was in the "Course Preparatory to Medicine," in the Scientific School of the University of Pennsylvania. His duty there was elementary instruction in physiology. Which he really preferred, physiology or hygiene, I never could decide. Either was more than broad enough, and with either he could have been content. It is certain that had his life been spared he would, sooner or later, have settled upon one or the other exclusively. It was necessary that he should have done so to produce his best results, and no one more quickly than he would have so discovered.

There was in his career no halting or hesitancy. He believed that only those who appreciate themselves and act for themselves can command the respect of others. Hence at no time, in any candidacy for professional or other honors, did he ever in the slightest degree apologize for his youth or depreciate his own right to freedom of judgment. After all, to such men official appointments are of very small importance. If no institution appreciates manly traits combined with great intellectual endow-

ments enough to secure them, then there is the open world where conscious integrity and fearless purpose will win their way to large success. Courage which stops short of aggressiveness by only a little, along with transparent honesty and a much greater than average mental activity, can always take the world, by storm if need be. These men require no favors.

During the last years in which Prof. Harrison Allen held the Chair of Physiology in the University of Pennsylvania, Dr. Randolph was made Assistant Demonstrator of Physiology. Dr. Allen writes of him: "I knew Randolph very well, and loved him dearly. He was faithful to trust, loyal in friendship, sagacious, affectionate and zealous. His career was one of preparation for the most part; but usefulness and honor were certainly to be his. His intellectual work showed great promise. His record as a teacher was already made at the time of his death. He was very popular with students and exerted a remarkable influence upon them. There is no doubt he would have attained a high rank as a platform lecturer."

After the resignation of Prof. Allen, Dr. Randolph abandoned his position as Demonstrator to the Chair of Physiology in the Medical Department of the University of Pennsylvania, and was made, in 1884, Instructor in Physiology in the Biological Department of the same University. July 18, he was elected to membership in the American Philosophical Society. He was also a member of the College of Physicians of Philadelphia.

His value was fast becoming recognized, and as he had filled his positions in the University to the entire satisfaction of the Trustees and the pupils, it is not strange that he was elected, in 1886, to fill the vacancy in the Chair of Hygiene, caused by the death of Dr. Joseph Richardson. In the very first meeting of the Faculty after he was elected to this position in the Auxiliary Faculty of Medicine, Dr. Randolph requested permission of his colleagues to show his respect to the memory of his predecessor by delivering that course of lectures in Dr. Richardson's name, and to turn the fees over to Mrs. Richardson. It was a graceful thing, *not a charity*, but simply one of those spontaneous acts which were so thoroughly characteristic of Randolph. It would never have been done, or even thought of, by any one less generous than he, and no one wondered at it—in him. Selfishness, or even the appearance of it, he abhorred.

The ease with which he wrote, the force, clearness and elegance of his style, combined to mark him as the man when, in December, 1885, an Assistant Editor was sought for the Philadelphia *Medical News*. He held the place until May, 1887, when he resigned it to take the Chief Editorship of the *Medical and Surgical Reporter*, published in the same city, and which, under the distinguished Dr. Daniel G. Brinton, had attained a very wide circulation.

Dr. Randolph's publications had not been very numerous. He had just entered upon the productive part of his life when he was taken hence.

He had, however, from time to time contributed brief papers to the scientific periodicals of the period. These are marked by clearness of statement, and the conclusions are so distinctly put that the busy worker could obtain the desired facts at a glance. For instance, he concludes his paper on the "Fæces of Starch-Fed Infants" thus: "First, that many infants of under three months can digest starchy foods. Second, that the individual variations in this regard are so numerous that no broad and general statement can be made as to the period at which infants begin to digest starches; and, Third, that the physician can be absolutely certain that a farinaceous ingredient in the diet of a young infant is beneficial, only by an examination of the dejecta under such diet. (See Transactions of College of Physicians of Philadelphia, 3d Series, Vol. vi, p. 443.)

In 1883, Dr. Randolph and Mr. A. E. Roussel contributed to the Philadelphia *Medical Times* a paper of great practical value, wherein it is proven that in about eighty per cent of the cases treated by inunction of cod-liver oil a notable increase of the fatty matter passed per anum was observed. This well-grounded observation is one to which the hard-pressed physician may frequently turn for support, in behalf of the conclusion that his oft-repeated inunctions have done good when the stomachs of his patients utterly refused to tolerate oleaginous substances, either as medicine or as food. It is the more important because of the scant use made of inunction by the medical practitioner.

In the Proceedings of the Philadelphia Academy of Natural Sciences, 1883, he published "A Study of the Distribution of Gluten within the Wheat Grains." This may be regarded as preliminary to the more extended paper, entitled "A Study of the Nutritive Value of Branny Foods." In the preparation of this, Mr. A. E. Roussel was associated with him. The conclusions reached are too long to be stated in full here. We may, however, as indicating the character of the paper, quote his fourth and fifth deductions: "That in an ordinary mixed diet the retention of bran in flour is a false economy, as its presence so quickens peristaltic action as to prevent the complete digestion and absorption not only of the proteids present in the branny food, but also of other food-stuffs ingested at the same time;" and, "That inasmuch as in the bran of wheat as ordinarily roughly removed there is adherent a noteworthy amount of the true gluten of the endosperm, any process which in the production of wheaten flour should remove simply the three cortical protective layers of the grain would yield a flour at once cheaper and more nutritious than that ordinarily used."

While it may be truly said that Dr. Randolph was by nature an investigator, yet his career as a popularizer of scientific knowledge gave almost equal promise. It is clear, however, that his choice of life work would have led him into the laboratory rather than into the field. The former gave time for thought and matured conclusions, whereas the latter often implied more hasty decision.

He was remarkable for his ingenuity in devising instrumental aids to his problems in science. In this it is not saying too much to assert that

few, if any, of his associates equaled him. His "Metastatic Heat Regulator" is an illustration. This simple contrivance was so arranged that a column of mercury regulated a gas jet so that, to use his own words, "temperature thus maintained is adjustable at will."

In January, 1887, he delivered, before the Franklin Institute of this city, a lecture on "Death." About the same time, there appeared in the (Philadelphia) *Medical Times* an article of his entitled "Is He Dead?" It was an admirable statement of the difficulties in defining just what is meant by the word Death. This may appear to be a mere play with words, but a perusal of the article will show, on the contrary, that it is a most important subject, and that there are serious problems and questions arising from the use of the word. The article in question makes clear to even the most unlearned, that at any point prior to that at which muscular putrefaction occurs there still linger about the body some of the attributes of life.

Besides the papers quoted above there are :

"On Certain Untoward Effects of the Administration of Turpeth Mineral," Randolph and Roussel, Philadelphia *Medical News*, 1884.

"A Preliminary Note on a Reaction Common to Peptone and Bile-Salts," in Proc. Phila. Academy of Natural Sciences, 1884.

"A Note on the Behavior of Hydrobromic Acid and of Potassium Iodide in the Digestive Tract," Phila. Neurological Society, April 28, 1884

"On the Digestion of Raw and Boiled Milk," Randolph and Roussel, in Proc. Phila. Acad. Nat. Sciences, 1884.

"On the Behavior of Petrolatum in the Digestive Tract," Proc. Phila. Acad. Nat. Sciences, 1884.

"Cutaneous Absorption of Nicotine," Randolph and Dixon, Proc. Phila. Acad. Natural Sciences, 1884.

"On the Dietetic Factor in the Treatment of Angina Pectoris." Read before the Phila. Neurological Society, 1884.

"On the Cutaneous Absorption of Salicylic Acid," Randolph and Dixon, Phila. *Medical News*, 1885.

"A Note on the Irradiation of Motor Impulses," Transactions of the College of Physicians of Philadelphia, March 2, 1887.

The above are his most important contributions. There are others, briefer and more hastily written often, which every one in the position of an editor must from time to time prepare, but which it would be unfair to allude to save as evincing the ease and grace of his style of composition.

On Friday, August 19, 1887, Dr. Randolph left his work and went to Longport, on the New Jersey coast, for a little needed rest. His family was already there. The change of scene and freedom from work appeared to give him new life. It was, however, evident enough that he was suffering from overwork. And though he very seldom alluded to his physical condition, it was quite clear that he realized he was overtaxed in mind and in body. Editorial duties and the business cares associated

with them were producing that state of mental worry which is the usual precursor of waning vigor. But besides these he still kept up his other appointments, save that of Physiology, in the Biological Department of the University of Pennsylvania. This he relinquished to Dr. Hobart Hare.

The surf bath which ordinarily infused fresh life into him failed to do so on Saturday morning. On Sunday, as the bathing hour approached, accompanied by his wife and little daughter, he went down to the beach. The party lingered there until all the bathers had retired, and then he and his wife went in for a "final dip." After a few minutes his wife noticed a change in his countenance. Probably they had ventured further than was safe, but, as they had often done so before, nothing was thought of it. After a few minutes struggling, in which he became separated from Mrs. Randolph, he fell forward, and—was dead.

From the account given by his wife, it is certain that there was a sudden heart failure, to which, and not to drowning, in the ordinary sense of the term, his death was due.

Though relief came as promptly as could be expected, all hope was gone. For two hours friends labored to restore him, feeling, however, that it was in vain. His devoted companion, taken from the water insensible, was saved almost by a miracle.

Thus, in his twenty-ninth year, was taken from us one who had already left his impress on the scientific character of the city in which he lived. His friend and associate, Prof. Harrison Allen, touchingly writes: "Randolph's name is to be added to the long list of young men we have lost in Philadelphia, in our own time—to Hare, George Pepper, Parry, Jenks, Rhoads and Hunter—a loss that is simply irreparable to us. His death came as a shock to the community in which he had, but a few days earlier, moved so full of activity and of promise. The leading daily papers spontaneously echoed the sentiments of those who knew him best, when they deplored his death as a public calamity."

It may not be improper to allude to the one indulgence of his life, that of cigarette smoking, and to ask whether it may not have been partly responsible for his death? This, probably, never can be answered, though we do know that he had long had a tendency to cardiac trouble; that his use of cigarettes was far from moderate, and that under such circumstances the physiological effects (or pathological effects) of tobacco upon the heart might almost be expected.

We are accustomed to regard this as an exceptional age, but, save when the world slumbered from wickedness and weakness just before the sixteenth century, there never has been a time when men did not think much the same of the period in which they lived. But may we not at least say that this has in some sense been an age of transition. It seems to be so notably in the relation of the woman to the world. We no longer ask, by how narrow limits can her life be circumscribed, but how wide a range can we open to her, or help her to open for herself? Dr. Randolph was "advanced" in his views on this question.

His broad humanitarian ideas revolted at the thought of being a laggard in the cause, and, from the first to the last, his voice was always in favor of opening every avenue to her aspirations, and thus allowing her to stand or fall by what she could do in the great moral and industrial struggles of our daily life. No popular prejudices, no sordid motives ever blinded him to the fact that she had a divine right to become a physician, a philanthropist, a reformer, and that it was not only in vain to oppose her, but that it was cowardly to do so.

It is remarkable to what an extent he had impressed his individuality upon others, without in the least trying to do so. Among his acquaintances, his advice was often asked and was honestly given; even when, from a selfish standpoint, it might have been prudently withheld. He was generous, perhaps, to a fault. When appealed to for aid, he seemed to think there was nothing to do but to give. The idea of refusing was so foreign to his nature that if it ever came at all, it was only as an after-thought.

Looking back upon his life in connection with our great University, one is surprised to find how many worthy young men he discovered, and how many of them he inspired with a zeal for work; and also how many of them he was the means of making life much easier to. I now remember but a single instance in which his protégés proved disappointing.

Dr. Randolph married Anna Louisa, daughter of Dr. William Charles and Elizabeth Lean Head. Three children survive him. His domestic life was one of rare happiness. Nothing diverted his affections or interest from his home and his work. His memory is precious for the illustration it furnishes of how much good may be done by one in early life.

*Remarks on the Pronghorn (Antilocapra Americana).**By Harrison Allen, M.D.**(Read before the American Philosophical Society, May 3, 1889.)*

While observing the movements of the two examples of the pronghorn, now in the Zoölogical Garden in Philadelphia, I noticed that the foot, in receiving the support of the body, exhibited the first phalanx partially extended upon the metapodium, and the second partially flexed upon the first. The movement was marked in a greater degree in the pronghorn than in any other ruminant in the Garden, which contains several specimens of the Old World antelopes.

It occurred to me that a heavier bulk of trunk would tend to force the phalanges nearer the ground, and that the digitigrade plan of progression be converted in this way into a phalangigrade. Comparing the foot of the pronghorn with that of the llama in which such a change has actually occurred, it was seen that in some respects the two animals move the feet in similar ways. Notably in this regard is the manner of turning the trunk on a limb which, in each of the animals named, is being used for support. The limb permits a marked degree of torsion to take place before the foot is lifted, and the twist to occur for the most part on the inner hoof, while the outer hoof describes an excursus.

Such conclusions led me to compare other parts of the hind limb with each other as they are found in the camel, the llama and the pronghorn. I found the several parts resembling each other in the following particulars, as distinguished from their congeners: While the thigh is exert in the camel and llama, it is partially so in the pronghorn. The fold of integument in the pronghorn which passes from the trunk to the limb reaches it at a point directly above the knee. In the deer it reaches it at the knee, or over the tuberosity of the tibia, and in the bovine group still further down. In the Virginian deer the fold answers to the separation of the venter color from that of the upper part of the side of the body and of the dorsum. In the pronghorn, the camel, and the llama, the fold answers to no localization of color. The camel, llama and pronghorn also resemble one another in the width between the thighs as seen from behind, and in the great inward inclination of the legs at the ankles.

These resemblances were so striking that I was induced to compare the crania of these animals with one another. I found that they agree in having the lachrymal bone* excluded in great part from the floor of the orbit, and in having the bone extended posteriorly to a less degree than the maxilla. In other ruminants (except the Chilian deer†) the lachrymal bone comprises the orbital floor and extends posteriorly beyond the maxilla.

* The peculiarities of the lachrymal bone are of special importance in determining the value of craniological characters. I have found its shape and relations of great interest in studying the mammalia.

† *Puduæ humilis*.

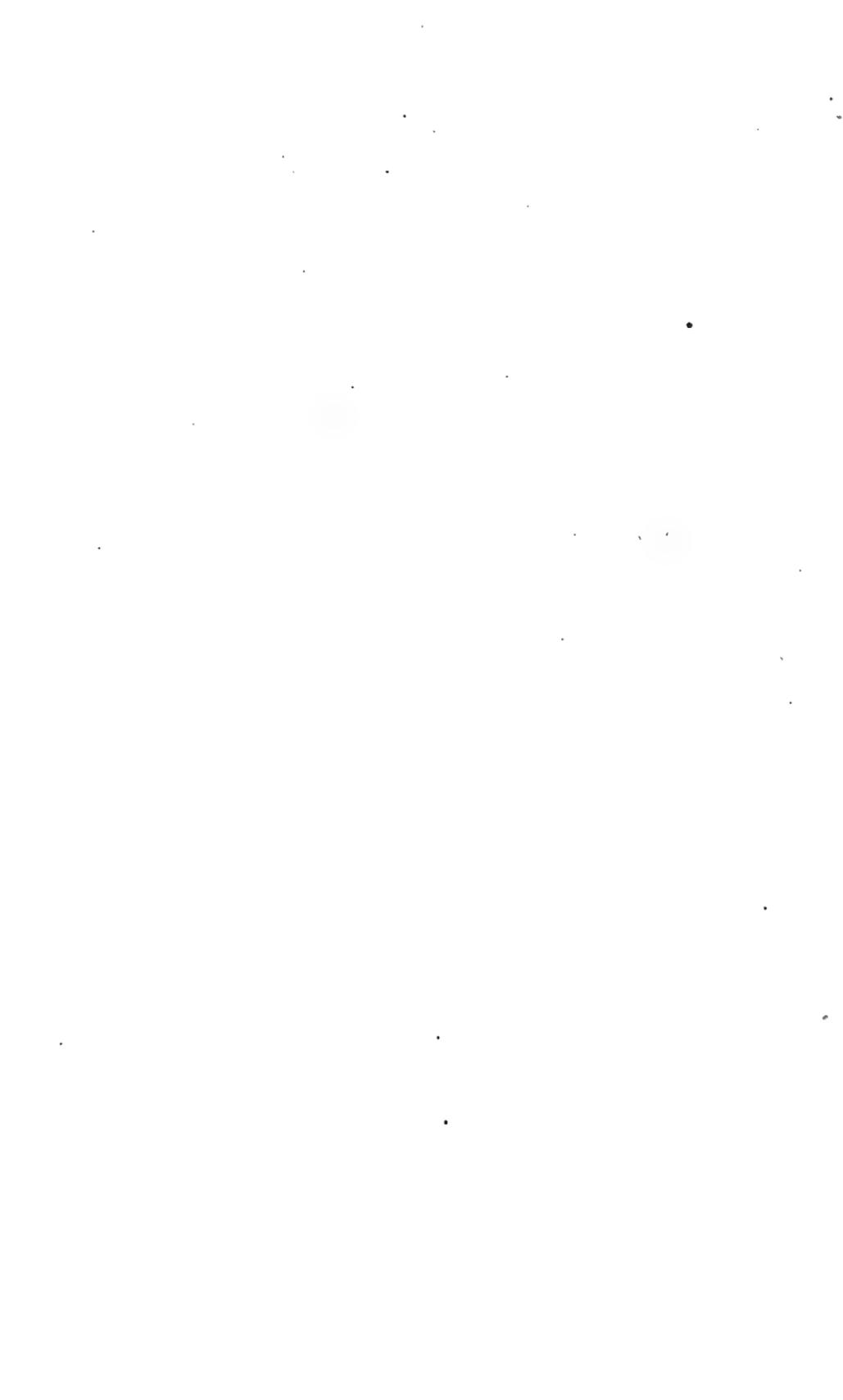
The vomer in the camel and llama advances far into the nasal chamber before joining the bones at the floor of the nose. The choanae are therefore imperfectly defined. This peculiarity, however, is of little value, since many forms of *Cervus* and its allies exhibit it.

The squamosal foramina are variable in different examples of the pronghorn skull, but on the whole they may be said to resemble those of the camel and the llama rather than those of other ruminants.

The angle of the lower jaw is not trenchant but inconspicuous and rounded in the three animals last named, and in this respect differs from other ungulates examined. In place of the process on the posterior border of the ascending ramus, seen in the camel and the llama, the pronghorn has the outline interrupted by an obscurely elevated rugosity.

It must be conceded that the above resemblances between the pronghorn and the family of the camels are decided, and it remains to point out their significance.

The Tylopoda and Pecora are separated by characters too profound to be bridged by any of those enumerated, and in the absence of proof presented by palæontology that the groups are connected through the medium of one or more extinct forms, it must be concluded that the characters are adaptive on the part of the pronghorn to enable it to live on terms of the same kind that environ the camel and the llama.



LIST OF DEFICIENCIES

IN THE

Library of the American Philosophical Society.*

PART FIRST.

(Read before the American Philosophical Society, May 3, 1889.)

PUBLICATIONS OF SOCIETIES.

ASIA.

Agricultural and Horticultural Society of India, Calcutta.

Transactions, all after Vol. VIII, 1841.

Journal, all after Vol. I.

Asiatic Society of Bengal, Calcutta.

Journal, Vol. I and all after Vol. IX.

Royal Asiatic Society (N. China Branch), Shanghai.

Journal, N. S., all before No. 6 and all after to Vol. XIV (inclusive).

XVI, XVII, all after No. 2.

XIX, all after No. 2.

Asiatic Society of Japan, Yokohama.

Transactions :

Vol. I, anything after Oct., 1873.

Vol. II, anything after July, 1874.

Vol. III, anything after Part 2.

Vol. IV, anything after July, 1876.

Vol. V, anything after Part 2.

Vol. VI, anything after Part 3.

Vol. X, anything after Part 1.

Vol. XII, Parts 2 and 3.

AUSTRALIA.

Royal Society of Tasmania, Hobarton.

Reports, all before 1849, also 1860, 1861, and all after 1870.

Papers and Proceedings, Vol. III, rest of volume after Part 2, if any.

Royal Society, Victoria, Melbourne.

Transactions, Vol. I.

Royal Society of New South Wales, Sydney.

Transactions and Proceedings, all before Vol. IX.

Linnean Society of New South Wales, Sydney.

Proceedings, all before Vol. VII, old series.

New Zealand Institute, Wellington.

Transactions and Proceedings, Vols. II, III, IV, VIII.

* NOTE.—The Society will be pleased to receive as donations any of the publications mentioned in this list.

AUSTRIA.

K. K. Geographische Gesellschaft, Vienna.
Mittheilungen, Bd. IV–VIII (inc.), X, XI.

K. K. Zoologische-Botanische Gesellschaft, Vienna.
Verhandlungen, I–XIV (inclusive), XX.

DENMARK.

K. Danske Videnskabernes Selskab, Copenhagen.
Oversigt, all before 1842.
Memoirs, IV–VII.

ENGLAND.

Bath and West of England Society for the Encouragement of Agriculture.
Journal [N. S.], X 2, XI 2, XII 2, XIV.

[3d ser.], Vols. I, II, III, IV, VI, VIII to XV (inclusive).

Letters and Papers, selected from the correspondence, all after XV 1.

Royal Horticultural Society, Liverpool.
Journal, all before and after VII 2.

Philological Society, Cambridge.
Proceedings, Vols. I–VI (inclusive).
Transactions, Vols. I, II.

Philosophical Society, Cambridge.
Transactions, XIII, all after Part 3.

R. Cornwall Polytechnic Society, Cornwall.
Annual Reports, 5th, 19th and 36th.

Yorkshire Geological and Polytechnic Society, Halifax, Eng.
Report of Proceedings, all before 1854; also 1858, 1859, 1861–1864, 1869.

Philosophical and Literary Society, Leeds.
Annual Reports, 1st–4th (inclusive), 8th, 9th, 10th, 32d, 41st–44th (inclusive).

Transactions, Vol. I, all after Part 1, 1830, and all volumes after.
Proceedings, all after No. 14.

Literary and Philosophical Society of Liverpool.
Proceedings, I, V, XIII, XIV, XV, XVII, XVIII.

Royal Asiatic Society, London.
The whole of Vol. X of the Journal, 1878.

Royal Asiatic Society of Great Britain and Ireland, London.
Journal, Vol. I, X, XIII 3.

London Society of Antiquaries, London.
Proceedings, Vols. I, II, Nos. 1–17 (inclusive), 1853. Vol. I [N. S.],
Nos. 2, 3, 4, and any after No. 8. Vol. II [N. S.], any after No. 5,
1864.

Lists, 1863–1865 (inclusive).

Royal Astronomical Society, London.
Memoirs, Vols. XXVII–XXXII, XLI.
Monthly Notices, Vols. XXII–XXV.

British Association, London.

Reports of Annual Meetings, 1860-1863 (inclusive), 1882

London Chemical Society.

Journal, Vol. I.

Vol. II, page 1-192 (inclusive).

Vol. III, page 1-320 (inclusive).

Vol. IV, page 123-222 (inclusive).

Vol. VIII, page 1-96 (inclusive), and 193 to end.

Vol. I, second series, Nov., 1863.

Vol. VII, October.

All after Jan. 1st, 1876.

Entomological Society, London.

Transactions, all except 1871, Parts 1-5.

Geological Society, London.

Quarterly Journal, Nos. 29 (VIII), 37, 38, 39 (X), 41, 42, 43, 44 (XI), 45, 46, 47, 48 (XII), 53 (XIV), and XVII, all after No. 1, and all after to XXI, 1865.

Lists of Members, all before 1841; also 1842, 1844 and all after 1845 to 1865.

Transactions, all after second series Vol. IX, 1845.

Proceedings, Vol. I, No. 1-17 (inclusive), 24, 25, 27, 29-31 (inclusive), III, Nos. 63 to 66, and all after Vol. IV.

Royal Institution, London.

Proceedings, Vols. I-III (inclusive), X, all after Part 3.

Lists of Members, all before 1849; also 1850, 1851, 1855, 1861-1867 (inclusive), 1871-1879 (inclusive), 1883, 1884.

Linnean Society, London.

Transactions, Vol. XXI 2, 3, 4, XXII 1, XXIII.

Proceedings, Sessions, all between 1855 and 1865 (inclusive).

Lists, 1853, 1860-1863, 1873-1879 (inclusive).

Journal of Proceedings, Zoölogy, Vol. IX, No. 38.

Meteorological Society, London.

Annual Reports, all before 1856; also 1859-1866, 1876.

Proceedings, Vols. I, II, and all after V.

Quarterly Journal, Vol. VII.

Record, all before Vol. XII.

Royal Society, London.

Philosophical Transactions, Vols. I-IV, XXXI-XLII, LX, LXV, LXXVIII 2, also 1851 3, 1852 3, 1853 2, 1854 3, 1855 3, 1857 2.

Statistical Society, London.

Journal, all before XXVIII 4, and after to XLVI.

Transactions, all after Vol. I 1.

Victoria Institute, London.

Journal of Transactions, Old Series, Vols. I-III (inclusive); Vol. IV, all after Part 1, 1859.

Literary and Philosophical Society, Manchester.

Proceedings, Vol. I.

Memoirs [New Series], Vol. X.

[3d Series], Vol. VIII.

Natural History Society of Northumberland, Durham, and Newcastle-upon-Tyne.

Transactions, Vols. I, II, III, IV, V i.

R. Geological Society of Cornwall, Penzance.

Transactions, Vols. all after 1846 to Vol. VIII 1, also any after VIII 2 to X 3.

Annual Reports, all before 29th, also 31st, 32d, 33d, 35th to 38th, 40th to 55th (inclusive).

EGYPT.*Institut Egyptian, Cairo.*

Bulletin [1st Series], all before No. 14.

FRANCE.*Société Linnéenne, Bordeaux.*

1st and 2d Series. 3d Series, Actes, Vols. V, VI, VIII all after No. 1.

4th Series, Vols. III 6, IV, VI, and all after VIII 1.

Société des Sciences Physiques et Naturelles, Bordeaux.

Mémoires, Tomes I, II, III, IV;

Extraits des Procès-Verbeaux des Sciences, all before 1868 ; also 1870-71, 1875-76, and all after to 1882.

Société de Géographie Commerciale, Bordeaux.

Bulletins, All the 1st Series except 1874-1875, No. 1.

2d Series, 1878, No. 1.

2d Series, 1879, No. 24.

And all after 1884, No. 14.

Académie N. des Sciences, Belles-Lettres et Arts, Bordeaux.

Actes, 1st and 2d Series, also 3d Series all before 1873.

Société Historique Lettrée, Artistique et Scientifique du Cher, Bourges.

Mémoires, all before Vol. II [4th Series, 1885].

Société N. des Sciences Naturelles et Math., Cherbourg.

Mémoires, all before Tome XI, 1865.

Société de Borda, Dax.

Bulletin, all before XI 4, 1886.

Académie des Sciences, Arts et Belles-Lettres, Dijon.

Mémoires, Vol. I and all after VII, 1785.

[2d Series] all after VII, 1858-1859, to XII, 1864.

[3d Series] I, II, III.

Société d'Anthropologie, Paris.

Bulletin, all after I 2, also [2d Series] Tomes I, II, IV, V 1, 2, 3, 4, and any after 5 ; VIII 3, IX 5.

Mémoires, all after I 1.

Institut de France, Academie des Science, Paris.

Mémoires de l'Acad. des Sciences, Tomes XXX to XXXIII (inclusive).
XLI, and all after XLII.

Comptes Rendus, XXXIX, Nos. 6 to 15.

Société N. des Antiquaires de France, Paris.

Mémoires, Vols. all after X, 1834.

[N. S.] II, IV, and all after V, 1840.

Société de Géographie, Paris.

Bulletins Vol. II [1st Ser.].

Vol. XIII [5th Ser.], March, 1867.

Vol. II [6th Ser.], August, 1871, and October.

Vol. IV [6th Ser.], September, 1872.

Vol. VI [6th Ser.], July, 1873.

Vol. IX [6th Ser.], Jan., Feb., April, May, 1875.

Annuaire, all before and after 1878.

Annales des Mines.

3d Série, Vol. XII, Part 4.

7th Série, Vol. XVIII, Part 6.

7th Série, Vol. XX, Part 6.

Société Internationale de L'Enseignement, Paris.

Revue, all before 6th Year, No. 7, 1886.

Société d'Ethnographie, Paris.

Mémoires, all before Vol. XIII, and all the publications before 1875.

GERMANY.*Verein für Naturkunde, Offenbach a. M.*

Bericht, II, III, IV, V, VI, VIII.

Verein für Kunst und Alterthum, Ulm.

Verhandlungen, Neue Reihe, Hefts 2-6 (inclusive), and all after 7.

Korrespondenzblatt, Jahrgang I, No. 8, all after 10.

Jahrgang II, No. 6, title-page and index.

Jahrgang III, No. 1.

IRELAND.*Belfast Literary Society.*

All the Publications except Select Papers, fasc. 1, 2, 1808.

Royal Irish Academy, Dublin.

Transactions, XII 2, XXI 1, XXIII, all after Part 2.

Proceedings, Vol. VII, all after Part 8.

Science [2d S.], III, all after Part 10 if any.

Cunningham Memoirs, I.

Royal Irish Institution, Dublin.

All except Annual Report of Committee of Directors (XI), June 24, 1824.

Royal Dublin Society.

Transactions [N. S.], I, all after 25, if any; II, all after 2; III, all after 13.
 Journal, Nos. 6, 9, 10, 42, 43.
 Proceedings [N. S.], IV, all after 9.

Dublin Geological Society.

Journal, Vol. I, 1, 2, and all after 4.
 Vol. VII, 2, 3, and all after 5.
 Vol. VIII, all after 3.
 The rest all wanting of the old series.
 [N. S.] VI, rest of volume after Part 3, if any.
 [N. S.] VII, rest of volume after Part 1, if any.

Dublin University Zoological and Botanical Association.

All except Proceedings, Vol. I, Parts 1, 2, 3.
 Vol. II 1.

ITALY.*R. Istituto di Studi Superiori Pratici e di Perfezionamento, Florence.*

Publicazioni, Sezioni di Filosofia e Filologia, Vol. II, any after No. 5 ;
 Vol. III, any after No. 1 ; and all after to date.

R. Istituto Lombardo, Milan.

Rendiconti, Vols. all after IV, also [2d Series] Class Let. Sci. Mer. et
 Pol., Vol. XIII, and Class Mat. e Nat., Vol. I.
 Memorie, I-VI (inclusive).
 Mat. e Nat. Cl., Vols. I-IX (inclusive).
 Letteri-Sci. Moral. Cl., Vols. I-IX (inclusive).
 Atti I, any after No. 10, and all after Vol. III, 1862-4.

Accademia, Modena.

Memorie, all before Vol. XIX.

R. Accad. di Scienze Lettere ed Arti, Padua.

Atti e Memorie, all before Vol. I, 1884-1885.

R. Comitato Geologico d'Italia, Rome.

Bollettino, Anno 1875, Nos. 1-4 (inclusive), and Vol. X, 1879.

R. Accademia dei Lincei, Rome.

Atti [1st Series], all before XIV, and Vols. XVI-XX (inclusive).

R. Istituto Veneto di Scienze, Venice.

Memorie, all before Vol. XIV, 1868.

Atti, all of 1st Series.

all of 2d Series.

[3d Ser.] all before Vol. XIII.

[4th Ser.] I.

NORWAY.

Norske Fortidsmendesmers Bevaring, Christiana.

Foreningen, all before 1866 ; 1870, and all after 1875.

All Registers except 1875.

SCOTLAND.

Royal Society, Edinburgh.

Transactions, Vols. XVII, XVIII, XIX, XXI, XXII, Part 1, and any
after Part 2, XXIII, XXX, all after Part 3, if any.

Proceedings, Vol. I, all after No. 1.

Vol. IV, all except No. 50, and all after.

Philosophical Society, Glasgow.

Proceedings, Vol. I, II, after Part 4 if any.

Vol. III, all after Part 6.

Vol. IV, all after Part 2.

Vol. V 1, and after Part 4.

Vol. XI, any after Part 2.

Vol. XII, any after Part 2.

Vol. XIII 2 and any after.

Transactions, Vols. I, III.

Geological Society of Glasgow.

Transactions, Vols. I, III.

Part 1 of Vol. IV.

Parts 1 and 3 of Vol. V.

Part 3 of Vol. VI.

SPAIN AND PORTUGAL.

R. Academia de Ciencias Nat. y Artes, Barcelona.

Acta, all before 1883-1884.

R. Academia de Ciencias, Madrid.

Revista, all before Vol. XXI, No. 7.

Memorias, all except 1 Ser., Ciencias Exactas, Vol. II 1, 1853 ; 3 Ser.,
Ciencias Naturales, I 3, 1854.

R. Academia de la Historia, Madrid.

Boletin, I, No. 6, V, No. 6.

Academia R. das Sciencias, Lisboa.

Memorias, Vol. VI.

[2d Ser.] Vol. I 2.

[Nova Ser.] all after II 1.

Sociedade de Geographia de Lisboa.

Boletim, all of the 1st, 2d, 3d and 5th Series ; 4th Series, all after No. 3.

SWEDEN.

University of Lund.

Acta, any before 1864; 1866, 1867, 1871.

Katalog, 1872-1875 (inclusive), 1879-1883 (inclusive).

SWITZERLAND.

Schweizerische Naturforschende Gesellschaft.

Verhandlungen, all before 51^e Jahresv., 1867.

Naturforschende Gesellschaft in Basel.

Berichte über die Verhandlungen, all after III, 1838.

Naturforschende Gesellschaft, Berne.

Mittheilungen, all before 1871, No. 745, and all after No. 791.

Société Economique de Berne.

Abhandlungen, any after 1773; Neue Sammlung, any after 1785; Neueste Sammlung, any before and after 1796.

Schriften, all before 1760, also 1767, 1774-1778, 1780, 1781, 1783, 1784, and all after 1785.

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[*To be continued.*]

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The Holiday Customs of Ireland.

By James Mooney.

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S Y N O P S I S.

INTRODUCTION.—*Saint Bridget's Day*—Origin—One of the great pagan fire festivals—Sacred fire of Kildare—Brigid an ancient Irish goddess—The *baighean breac*—The *Brideog*—The *Crios Bhrighide*—Gaelic and English verses sung—The crosses of rushes—Passing through the *crios*—Bringing home the rushes—Hebrides custom. *Saint Patrick's Day*—The national festival—Festivity the chief feature—Lover's account of the birth of Saint Patrick—Weather sayings—The *croiseog*—Processions—Drowning the shamrock. *Shrove Tuesday, Lent and Easter*—Shrove Tuesday, perhaps, the ancient festival of *Beinid*—Marriage season—Taking to Skellig—Tossing the pancake—*Sruthan na ngadaraidhe*—Cock throwing—Ash-Wednesday—Good-Friday—Strange fishermen's custom—Easter Sunday—Eggs and bacon—The Easter dance—The dancing sun—Beliefs. *May-day or Bealtuine*—A universal ancient festival—The second of the Irish fire festivals—Kindling the new fire—Sacrifices—Passing through the fires—Ceremonies relating to cattle—The gilded ball—May Sunday in Cork—Bonfires and May-poles—Nettlemas night—Fire beliefs—The May-pole and May-bush—The rowan tree—The May dance—The May queen of Finglas—The May boys—Miscellaneous beliefs, cattle, witches, butter stealing—Fairy beliefs—Love charms—Repairing the fences—Settling the dues—Omens—An unlucky birthday—Easter derived from the May festival. *Whitsuntide or Cingcis*—Strange fatality in the season. *Saint John's Eve or Midsummer Night*—Ancient festival of the summer solstice—Universal festival of Modern Europe—Third great fire festival of Ireland—The bonfires—Origin of the word—The celebration in the north—Cattle ceremonies—The "white horse"—Fairy time—The celebration in the west. *Samhan, or Hallow E'en*—Origin—The last of the fire festivals—The great Feis of Tara—The modern celebration—The apple a

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The world has grown so familiar with the stories of misrule, suffering and violence in Ireland, that we are apt to forget that there is another side to the picture, and that every nation has a home life as well as a political existence. The little every day cares and pleasures of the household, the merrymakings and social gatherings of neighbors, and the occasional holidays, make up the real life of a people, and he who is ignorant of these knows not the nation, however familiar he may be with the history of its kings and rulers, their battles, victories and defeats. The heroes of Gettysburg and Spotsylvania were men who enjoyed a good dinner, or a quiet smoke after a hard day's work, as much as any of us, and, as boys, took fully as much delight in a Fourth of July celebration or a raid on a watermelon patch. The dreaded Moonlighter or the unspeakable Fenian will walk as many miles to a country dance as ever did Carleton's rollicking Ned M'Keown, is just as anxious about the condition of the potatoes and the health of the pig, finds as much satisfaction in listening to a fiddler at a wedding or a story teller at a wake, and in his young days was just as eager in hunting the wren on Saint Stephen's day or feeding the bonfires on Saint John's eve.

What are called the popular customs of a nation are always best preserved by the agricultural and village portion of the population, a class especially numerous in Ireland from the fact that the peculiar political conditions of the country compel the great bulk of the people to draw their living directly from the soil, leaving them but scant opportunity to acquire an education or to become familiar with modern progress. In spite of all this, however, the old customs are decaying here as elsewhere,

and many of the observances which were once general are now confined to remote mountain districts or live only in the memory of the older people, while others, again, are still common throughout the country. As there is but little communication amongst the peasantry of different districts, excepting at the fairs in the summer time, the customs common in one parish are sometimes entirely unknown in another hardly ten miles distant. In this paper we shall describe the beliefs and customs connected with the observance of the principal Irish holidays, omitting those of lesser importance. As a number of these holiday observances are more or less common to all the Aryan nations, especially to those of Western Europe, it must suffice to note the fact here without entering into a detailed comparison. The features more peculiarly Irish are mainly derived from the old druidic worship. Where authorities are not given, the statements are the result of personal investigation. As a matter of convenience, all those customs which were in use within the present generation are described as still existing, although some of them are now obsolete.

The essentially foreign customs found only in those districts—chiefly in the north—occupied principally by Scotch and English settlers, have no place in this connection. Aside from these, however, many of the genuine Irish observances have evidently been considerably modified by English influences. This is especially true of the May-day and Christmas celebrations, while in regard to the many holiday rimes it is hardly too much to say that they have been imported bodily from England. The same may be said of many of the children's rimes, riddles and other formulas, even in the remote west where the Gaelic is the ordinary language of the people. This may be due in some slight degree to contact with the English colonists in Ireland, but by far a more efficient cause is to be found in the annual summer exodus of the Irish harvesters. As soon as the corn begins to ripen troops of the poorer laborers from every part of the country turn their faces toward Dublin and Queenstown, where, embarking by thousands, they cross over to Liverpool and range in small parties from one end of the country to the other until the harvest is over and cold weather approaches, when they return to their own land with a few pounds apiece to pay the rent and perhaps a few shillings extra to buy salt for the potatoes. During these summer months they mingle constantly with the rural English population, by whom the old customs are most cherished, become familiar with their habits, games and sayings, and enter into a friendly intimacy such as is never extended to those of the same race in Ireland, where they are always regarded by the natives as foreign usurpers, and disliked and avoided accordingly.

SAINT BRIDGET'S DAY, FEBRUARY 1.

The observances connected with New Year and Twelfth-night will be described in treating of the Christmas holidays, of which these festivals form a part. Proceeding onward in the calendar the first great festival is that of Saint Bridget's day, February 1. The ceremonies in this case, as

in that of several other holidays, begin on the preceding eve, as among the ancient Irish the day was considered to begin at sundown. This is a peculiarly Gaelic festival, and its observance under this name seems to be confined to Ireland and the remoter districts of Scotland; but there is every reason to believe that it was a part of a general European fire celebration, which still survives in Candlemas, the second of February. In ancient Rome, as in Ireland, this festival was dedicated to a female deity, Februa, in whose honor the people carried burning torches about the streets just as the candles are now lighted in honor of the Virgin Mary. In ancient Ireland the day now consecrated to Saint Bridget was the occasion of the first of the five great fire celebrations of the year, and it seems probable that bonfires were lighted then as on the eves of May-day and Saint John.

Saint Bridget was one of the earliest disciples of Saint Patrick, the apostle of Ireland, and founded a convent of nuns at Kildare in the year 484. This cloister, like that of the vestal virgins of ancient Rome, was celebrated for its perpetual fire, which was fed and guarded by the nuns, and which, with the exception of a short intermission in the thirteenth century, burned constantly for more than a thousand years until the suppression of religious establishments by Henry VIII. It was permitted to blow this fire only with a bellows and not with the breath.* This remarkable incorporation of the old fire worship of the country into the service of a Christian saint, together with the fact that *Brigid* (pronounced *Breej*) was the name of one of the deities of pagan Ireland, render it probable that the ceremonies now practiced in honor of the saint are but modifications of the ancient rites intended to propitiate the heathen goddess, who, from the character of the observances, would appear to have been the special protectress of cattle and the dairy. This is the more likely as it is a well established fact that almost every practice known to the holiday calendar of modern Europe had its origin in the pagan ceremonials of pre-Christian times. The date also corresponds closely with that of the first of the five great annual fire festivals of ancient Ireland. The lark is held sacred to Saint Bridget because its song used to wake her to prayers every morning, and if heard singing upon her day it presages good luck and fine weather.†

The Gaelic name of Saint Bridget's eve is *Oid'ce B'rigide* (pronounced *Ekha Vreja*, or, incorrectly, *Eel Vreja*), "Bridget's Night." In the last century, according to Vallancey, it was customary on this occasion for every farmer's wife to bake a cake called the *bairean breac* (*bauran brac*) or spotted cake. The house was then set in order and the neighbors invited, the cake sent round with ale and pipes, and the evening was spent in mirth and good humor.‡ In the east and south-east young girls dress up the churn-dash to represent Saint Bridget, and carry it in procession

* Grimm, Mythologie, i, 578.

† Lady Wilde, ii, 121, 136.

‡ Vallancey, Collectanea (Ant. Ir. Lang), ii, 201.

from one house to another, expecting to receive a treat at each, and in this they are seldom disappointed. In the city of Limerick, where, as may well be supposed, the old custom has degenerated, a broom is dressed up, not as the saint, but as "Miss Bridget."

In Galway and other parts of the west, companies of young girls carry about on this eve a figure known as the *Brideog* (*Breejoeg*), made of straw and rushes and dressed to resemble the saint. At every house the carriers sing a short verse or two, and are rewarded with a small gift of money or cakes, the net proceeds being expended by the participants in a jollification later in the evening. The young men, with their faces covered with painted masks of paper, go about in like manner, singing verses and carrying a rope known as the *Crios Brigidie* (*cris Vreja*) or "girdle of Bridget," which will be described later. The ends of this rope are joined so as to form a circle, through which every one is expected to pass on payment of a small trifle. The Gaelic verse commonly used in Galway is as follows :

Crios Brigidie, mo e'rios,
Crios na d-tri g-cros.
Eirig suas, a b'ean na tig',
Tab'air d'am rod-a cinnt 'sgo t'ri mo e'rios,
Agus go m-bud seac't mille fearr b'eid'eas tu bliag'ain d' anoc'd.*

Which may be rendered literally :

Bridget's girdle, my girdle,
Girdle of the three crosses.
Rise up, woman of the house,
Give me something and pass through my girdle,
And may you be seven thousand times better a year from to-night,

The English verse used in Eastern Galway runs thus :

God bless the master of the house,
And the mistress also,
And likewise the little children
That around the table grow.
Go down into your cellar,
If anything you can find
Your pockets are not empty
If to help us you're inclined.
Your pockets are not empty
Of money or strong beer (!)
And we'll trouble you no more again
Until another year.

While this verse is well known in East Galway, it is English in its origin and easily to be recognized as such, altho as here given it has received one or two unmistakable Irish touches. No genuine Irish popular song would ever bid the master go down into the cellar, such a thing being an

* Pronounced: *Cris Vreja, mo khris,*
Cris na jre grua.
Iree suas, a van a che,
Thoar um rudh a ceench sgú hre mo khris,
Ógus go má shokhth meetya fár vise thu bleeen o nukhth.

unknown appendage to the house of the ordinary farmer or peasant. In trying to avoid this incongruity farther on, by substituting the word pocket for cellar, the boys hav only made matters worse by filling the pockets aforesaid with strong beer. The original of the first four lines is the Yorkshire Christmas carol, as given by a writer of 1824 in the *Gentleman's Magazine* :

"God bless the master of this house.
The mistress also,
And all the little children
That round the table go."*

The remainder is probably taken from a verse given by Brand as sung by English children on All Souls' day, and much resembling another verse sung on Easter morning. The last lines of the former ar as follows :

"Put your hand in your pocket and pull out your keys,
Go down in the cellar, bring up what you please,
A glass of your wine or a cup of your beer,
And we'll never come Souling till this time next year."†

According to O'Reilly's "Dictionary," the Brideog is used by girls on the eve of the saint to determin who shal be their future husbands,‡ which is the only hint the writer has receivd thus far of its use as a love charm. The Brideog is unknown in the north and in the south-west, but in both sections, as wel as in Galway and throughout the greater part of Ireland, it is customary to hang up about the walls of the house numbers of small crosses made of straw or rushes. In Galway these ar made, at least in part, of materials taken from the Brideog after it has servd its original purpose in the procession. In the ordinary cross each arm is made of three strong rushes or straws, converging at the ends and widening out in the centre of the cross, where they ar interwoven. In Kerry a more elaborate cross is sometimes made of wood, about 5 x 8 inches in length. Short crosspieces ar fastend near each end so as to make four smaller crosses, around each of which is brought a single rush or straw in diamond fashion, while a similar larger diamond is fixt around the centre of the cross. Should a Kerry farmer hav a firkin of butter on hand as spring approaches, he wil defer opening it until this day.

The *Crios B'rigide* or "Girdle of Bridget," already mentiond, plays an important part in these ceremonies in the western districts. This is a rope made of green rushes, procured the day before, or if rushes be scarce, it is made of straw, with three green rushes plaited into it. The rope is made sufficiently long to allow a tall man to pass through the circle without difficulty when the ends ar joind together to form the girdle. It is made on Saint Bridget's eve, and as soon as the ends of the rope hav been joind, the master of the house holding it doubled up in his right hand, makes the sign of the cross with it in the name of the Trinity

* Pop. Sup., 94.

† Brand, *Antiquities*, I, 413.

‡ Edward O'Reilly, *Irish-English Dictionary*, new ed., n. d., Dublin, under *Brideog*.

and passes it three times from right to left around his body. Then holding it out at arm's length in his right hand, he lets one end drop so as to form a circle, through which he passes three times, putting the right foot through first each time. He then doubles up the rope and again passes it three times around his body as at first. He is followed in turn by every member of the family. In some cases the girdle is simply laid on the floor in the shape of a circle and each one passes through it by lifting up one side to step under, and then raising the other side to step out again. In the morning—Saint Bridget's day—the girdle is hung over the stable door and all the animals are made to go through it. This ceremony protects both men and animals from the influence of evil spirits throughout the year. In some cases the rope is kept in the family from one recurrence of the festival to another. A rush taken from it and tied about the head will keep the headache away from the wearer for a year.

In different parts of the country there are several interesting ceremonies in connection with bringing home the rushes, which are procured on the day preceding the festival. In Galway, the boys go in the morning to the small streams in the neighborhood and gather bundles of the green rushes. In the evening—the eve of the festival—these are brought around to each house, which, in every instance, is found with the door tightly closed, the family being waiting in silence within. Going up to the door, the boys shout seven times, "*Leig astear Brig'id*" (*Lig aschökh' Breej*), "Let Bridget enter," while to each demand those within reply, "*Leig a's céad fáille rom'ad*" (*Lig os caidh fuilcha roath*), "Enter and a hundred welcomes before you." The door is then thrown open and the boys come in and leave some of their rushes, for which they are rewarded with a small treat, after which they go on to the next house. Occasionally, some families get their own rushes.

In Donegal, the bringer of the rushes is a girl, who is called *Brig'id* for the occasion, and it is seldom that a family of girls is without one of this name to enact that part in the ceremony. The rushes having been previously left at some convenient spot outside, *Brighid* goes out after dark and the door is at once closed after her. Taking up the bundle of rushes, she approaches the house and goes all around it, seeking an entrance, while those inside affect great terror and observe the strictest silence. On getting around to the back of the house, she sings :

*Guid' me a' mo g'luna,
Agus deoirid' go mo súille,
Agus leig astear' Brig'id.**

I implore on my knees
And with tears in my eyes,
And let Bridget within.

* Pronounced in Donegal, somewhat incorrectly: *Gú mae er mo ghluna,
Ócus dherdh'e go mo súlla,
Ógus lig aschokh' Breej.*

on which those inside shout gladly, "*Sí b'eat'a, sí b'eat'a, sí b'eat'a*" (*she rāha, she rāha, she rāha*), "She's welcome, she's welcome, she's welcome," and, the door being opened, Brighid enters and deposits her rushes on the floor. According to a writer of 1716, a somewhat similar custom formerly existed in the Hebrides, where a sheaf of oats was drest as a woman and laid in a cradle known as "Brighid's bed," while the people shouted, "Brighid is come, Brighid is welcome."* This ceremony is, probably incorrectly, assigned to Candlemas, the day following Saint Bridget's day.

In the west and south a handkerchief, known as the *Brat Brigide* (*Broth Breja*), or "veil of Bridget," is left out over night on the saint's eve, and when saturated with dew in the morning is used to cure calv's of a disease known as *ruatt'ar péiste* (*rochar paeshcha*), or the "depredation of the worm," by striking them with it three times in the name of the Trinity.

SAINT PATRICK'S DAY, MARCH 17.

Altho Saint Patrick's day is pre-eminently the Irish national holiday, not much can be said of it in a descriptiv way, as the observances connected with it hav but little of the old ceremonial or mythologic character. Processions and speeches in the larger towns and smaller gatherings in the country villages, with the assistance of the pipers and fiddlers in the evening, fill out the day, while every one seems bent on carrying out to the letter the spirit of the old ballad which declares that

"Saint Patrick's day we'll be all very gay."

The festival commemorates the apostle and patron saint of Ireland, this day, according to most writers, being the anniversary both of his landing in Ireland and of his death, the latter occurring in the year 493. That typical Irish poet, Samuel Lover, by turns so humorous and so pathetic, gives the following characteristic account of the origin of the celebration :

The Birth of Saint Patrick.

On the eighth day of March it was, some people say,
That Saint Patrick at midnight he first saw the day,
While others declare 'twas the ninth he was born,
And 'twas all a mistake between midnight and morn ;
For mistakes will occur in a hurry and shock,
And some blamed the baby, and some blamed the clock,
Till with all their cross-questions, sure no one could know
If the child was too fast or the clock was too slow.

Now the first faction fight in old Ireland, they say,
Was all on account of Saint Patrick's birthday.
Some fought for the eighth—for the ninth more would die ;
And who wouldn't see right, sure, they blackened his eye !
At last both the factions so positive grew
That each kept a birthday, so Pat then had two ;
Till Father Mulcahy, who showed them their sins,
Said, "No one can have two birthdays but twins."

* Martin, "Account of the Western Islands of Scotland," quoted in Brand, *Antiquities*, 50.

Says he, "Boys, don't be fightin' for eight or for nine;
 Don't be always dividin'—but sometimes combine;
 Combine eight with nine, seventeen is the mark,
 So let that be his birthday." "Amen," says the clerk,
 "If he wasn't a twin, sure our history will show
 That, at least, he's worth any two saints that we know!"
 Then they all got blind drunk, which completed their bliss,
 And we keep up the practice from that day to this.

It is a saying among the people that after Saint Patrick's day it is time to begin to make garden. In Connemara they say that one should have half his farm work done by this time and half his fodder still on hands, and that after this every alternate day will be clear and sunshiny. The weather on this day is proverbially fine, and of course there is an Irish reason for it. In the first days of Christianity in Ireland Saint Bridget was much hindered in her work by the rains, which are especially frequent in this country, until at last she obtained as a favor from God that every other Sunday should be a clear day, so that she might preach to the crowds which came to hear her. Not to be outdone, Saint Patrick asked that his anniversary might be a day of sunshine, which was granted, and from that time forth the 17th of March has always been a fine day.*

On this day every child throughout Ireland, excepting in Connemara and some of the northern districts, is expected to wear upon the left breast a small disk intersected by crosses upon the surface and known as a *croiseog* (*crishoeg*) or "favor." In Connemara the *croiseog* is worn only by the women. They are of various designs and colors, but the general pattern is everywhere the same. The disk is made of stiff paper, or of silk lined with pasteboard, and across the surface are pasted strips of paper of different colors, crossing each other at right angles, so as to form some even number of crosses having a common centre in the middle of the disk. These strips are sometimes cut so as to give the arms of the cross an elliptical shape. Around the edge of the disk, between the arms of the crosses, are drawn small arcs which are filled in with dots, shamrocks and other figures, in ink of various colors. The ends of the crosses are sometimes trimmed with ribbons. In Clare and Connemara there is usually but one cross, which is drawn upon the surface of the disk with the blood of the wearer, the blood being obtained by pricking the end of the finger. The green is usually procured from grass and the yellow from the yolk of an egg.

At the merrymaking, in the evening, no good Irishman neglects to "drown the shamrock" in "Patrick's pot"—in other words, to dip the shamrock in a glass of whisky. After wishing the company health, wealth and every prosperity, including "long leases and low rents," he dips the sprig of shamrock into the liquor which he is about to drink and then touches it against another, which he wears in his hatband in honor of the day. It is hardly necessary to state that the shamrock is a small variety of clover and the national emblem of Ireland. According to the popular

* Lady Wilde, II, 121, 122.

belief, its adoption as the national ensign dates from the time when Saint Patrick used it to explain to the pagan Irish the mystery of the Trinity, or three in one. In East Galway and adjacent parts, the processions on this day carry banners bearing representations of incidents in the traditional life of Saint Patrick, such as the baptism of Oisín, the banishing of the snakes, etc. Everywhere men wear the shamrock in their hatbands, while women and children fasten it in their hair or upon their breasts.

SHROVE TUESDAY, THE LENTEN SEASON AND EASTER.

The customs pertaining to the Lenten season, with the attendant festivals of Shrove Tuesday, Good-Friday and Easter, may properly be treated together, and as they are based upon ideas which are in great part the common heritage of Christian Europe, they vary but little in the different countries. The first festival of this season is *Shrove Tuesday*, or as it is called in the eastern and northern districts, *Seraf' Tuesday*. This feast, like the others pertaining to Lent, is movable, but generally occurs toward the close of February, thus corresponding with the old pagan feasts of Bacchus and Pan—the Bacchanalia and Lupercalia—of which Shrove Tuesday is probably the modern descendant. From its Gaelic name, *Inid (Inij)*, Smiddy argues that it may correspond in Ireland with the ancient festival of Beinid, the Minerva of the pagan Irish.* The Roman feast of Minerva took place about the middle of March, and was celebrated by public amusements, and was also a favorite time for getting married. This statement still holds good throughout all Catholic countries, where marriages are prohibited by the Church during the succeeding six weeks of Lent. On this subject the same author says: "It is also remarkable that in the Irish-speaking districts more marriages take place at this season than at any other period of the year. The feasts and the marriages are at present ascribed to the near approach of the season of Lent; but perhaps, like the other popular festivities of the year, they had their origin in something more remote, though now forgotten." † Back of all mythology the custom probably has its explanation in the fact, as stated by the poet, that

"In the spring the young man's fancy lightly turns to thoughts of love."

It is popularly expected that all the marriageable young folks shall have been mated before Lent, and on this, the last day of grace, the young men in Cork, Waterford and other towns of the south, were formerly accustomed to go through the streets in bands, carrying ropes, with which they caught any unlucky girl who had "mist her chance," and pulled her a few rods along the road, after which she was released. This was called taking her to Skellig to get married, the allusion being to the Skellig rocks on the coast of Kerry, formerly a noted place of pilgrimage, toward the end of the Lenten season, for young women who desired good husbands. This "taking to Skellig" has supplanted an older and rougher pastime,

* Smiddy, *Druids*, 112.

† *Idem*, 112-3.

practiced in the south about fifty years ago and known as "drawing the log." Any unmarried young folks of either sex who wer so unfortunate as to be caught on the streets on this day wer compeld to drag a heavy timber at the end of a rope, followd by crowds of men and boys armd with shillelaghs and shouting, "Come draw the log, come draw the log," while keeping step to the music of a piper in attendance. In Hall's "Ireland,"* this custom is assigned to the following day, Ash-Wednesday, which is obviously a mistake.

In Clare, it is said that all the disappointed young women—and, for that matter, the disappointed young men as wel—are in a bad humor on Shrove Tuesday night, and their soreness continues to increase all week, so that by Sunday they can be distinguisht by the "puss" on their countenances. Hence, the first Sunday in Lent is there known as "Puss Sunday," and mischievous boys delight in marking the backs of the unfortunate ones with flour or chalk so as point them out to the whole congregation. This practice exists also in Kerry, where there is a popular legend that on the night of Shrove Tuesday, all the disappointed lovers of both sexes shoulder their burden of wasted hopes and blighted affections under the form of a bundle of gads or rods and repair to the banks of a mystic river, known, on this account, as *Srut'án na ngadaraíde* (*srúhawn na ngódhéréé*), or the "stream of the gads," where they get rid of their troubles by throwing the whole load of affliction into the water. Going to *Srut'án na ngadaraíde* is the Kerry equivalent for going up Salt river.

In the evening, the young folks—and the old ones as wel—gather round the turf fire to learn, by "tossing the pancake," what is to be the result of their future marriage ventures. A crock of batter having been prepared, a part is poured out on the pan to form the first cake, which is consignd to the care of the oldest unmarried daughter. At the proper time, she turns the cake with a dextrous toss up the chimney, and if it comes down smoothly on the other side in the pan, she can hav her choice of a husband whenever she likes. If, on the other hand, it falls into the ashes or comes down with a corner doubled over, she cannot marry for at least a year. This is also regarded as an omen of il fortune with an accepted lover, and so strong is this feeling that engagements hav even been broken off for no other reason. The lucky tosser of the first cake at once shares it with the other girls. On eating it there is generally found in one slice the mother's wedding ring and in another a piece of furz, both having been put into the batter before baking. Whoever gets the ring wil be most happy in her future choice, while the other wil remain unmarried. A similar custom exists in England and Scotland.

The cruel custom of cock throwing on Shrove Tuesday, which stil exists in England, was formerly known also in Ireland, but is now extinct.† A cock was tied by the leg to a stone or stick, and every person who paid the small sum demanded was allowd to throw at it from a certain distance,

* Hall, Ireland, i, 315.

† *Ibid.*

the one who kild the bird being permitted to take it home with him. There is evidence to show that this custom originated in England, and was probably intended at first to giv expression to the national hatred for the French, a cock and a Frenchman having in Latin the same name, *Gallus*.*

Little need be said of *Ash Wednesday*, rendered literally in Gaelic by *Cedín a Luait'rid'* (*Cédheen a Luaree*). In accordance with the general custom, it is observd as a day of solemn devotion. The ashes consecrated in the church upon this day ar preservd with religious care as a safeguard against evil influences, and with this intention mothers sometimes make the sign of the cross with the sacred ashes upon the foreheads of their new-born infants. In Ireland, as in all Catholic countries, branches of palm, or some evergreen substitute, ar worn in the hat or upon the breast on Palm Sunday.

Good-Friday, in Gaelic *Aoine Ceasda'* (*Ena Caesdhu*), or "Crucifixion Friday," is also of but secondary importance in regard to any popular customs connected with it, altho one of the most solemn festivals of the Church. It is a day of prayer and rigid fasting, and in some parts of the country even infants ar not allowd the breast unless they cry three times for their accustomed nourishment. Brand states that it was formerly customary for women to go along the roads with bare feet and dishevel'd hair in imitation of Christ's sorrowful journey to Calvary.†

It is said that an eg laid on Good-Friday wil keep good until that day twelv-month. The same belief is held in England and on the continent in regard to bread baked upon this day. It is also customary to cut the hair upon Good-Friday in order to cut away the sins of the past year and begin a new life with the coming Easter, and any one doing so wil hav no headake for a year thereafter. Among the west coast fishermen of Connemara there exists the strange and barbarous practice of bringing home on this day living fish, which ar afterward fried alive.

Easter Sunday is the festival of colored eggs in Ireland, as wel as elsewhere in Europe and America, the eg being an ancient symbol of the resurrection. Eggs and bacon form the principal Easter dish, to which, in Roscommon and adjacent districts, there is added a cake, with a dance in the evening. According to an old writer, quoted in Brand, the eggs and bacon wer formerly prepared, in the central districts, late the previous evening, but not toucht until the cock crew. The company then clapt hands with shouts of "Out with the Lent!" and made merry a short while before going to bed.‡

Piers thus describes the Easter festivities in Westmeath, in 1682: "On the feasts of Easter and Whitsuntide, the more ordinary sort of people meet near the ale house in the afternoon on some convenient spot of ground and dance for the cake; here, to be sure, the piper falls not of diligent

* See Pop. Sup., 310, 311.

† Brand, *Antiquities*, 1, 152.

‡ *Ibid.*, 1, 161.

attendance. The cake to be danced for is provided at the charge of the ale-wife, and is advanced on a board on the top of a pike about ten feet high; this board is round, and from it riseth a kind of a garland, beset and tied round with meadow flowers, if it be early in the summer; if later, the garland has the addition of apples set round on pegs fastened unto it; the whole number of dancers begin all at once in a large ring, a man and a woman, and dance round about the bush, so is this garland call'd, and the piper, as long as they are able to hold out; they that hold out longest at the exercise win the cake and apples, and then the ale-wife's trade goes on." *

If any one who has kept the Lent wel will rise early on Easter morning, he will be able to see the sun dance in the sky for joy at the resurrection, altho some persons assert that the sun givs but three leaps on this occasion. A favorit method is to observ the reflection in a wel or stream of water. In Kerry, the fish ar said to be asleep on this day, and the old people declare positivly that they can easily be caught with the hand in shallow water. In Meath, the day is held so sacred that it is said, that if one should black his shoes in the morning and then rub the brush against a tree, the tree would be dead before that day twelv-month. More wil be given in this connection in speaking of the next festival.

MAY-DAY OR BEALTUINE, MAY 1.

The next great festival is May-day, the first day of May, which, being generally regarded as the beginning of summer, has been observd as a holiday throughout Europe and in many parts of the Orient from the most ancient times. In Rome the feast of Maia was held upon this day and was preceded by the Floralia, lasting four days and celebrated in honor of Flora, goddess of fruits and flowers. It is probable that the ancient Irish festival also lasted several days, as in Gaelic Scotland the Bealtuine period is stil considerd to extend from the first to the eighth of May. † The old Scandinavians observd the day with feasting and dancing and a mock fight between winter and summer. ‡ The ancient Persians celebrated the festival upon the 21st of April, when every fire was extinguisht, to be relightd with sacred fire from the temples. § The essential features of this modern celebration, as wel as the beliefs connected with the day, vary but little throughout Europe, the festivities consisting chiefly of dancing around bonfires, or poles decorated with flowers and ribbons, while the omens relate to the prosperity of the dairy or the wedded lot of the girls. Certain trees ar held particularly sacred in connection with these observances, the May-pole being of oak in England, an elm in Cornwall and a birch in Wales, ¶ while in Ireland the chosen tree is the *crann-*

* Piers, Westmeath, 123.

† See note in Pop. Sup., 51.

‡ Brand, Antiquities, i, 222.

§ Lady Wilde, i, 194.

¶ Brand, Antiquities (quoted), i, 236-7.

caoran (*craon-ceeran*), the rowan or mountain ash. The May season, and especially May eve, is universally regarded as a favorite time for fairy revels and witches' spells.

The Gaelic name of May-day is *Lā Bealtuine* (*Law Béalthinn*), "the day of the Beal fire," Beal being the fire god of the Keltic nations and almost identical with Baal or Bel, the sun god of the Phœnicians and Assyrians. The month itself is called "the month of Bealtuine." The pagan Irish were fire worshipers, and this was one of the five great fire festivals of the year, the others being celebrated respectively at the beginning of spring—about Saint Bridget's day; at midsummer on Saint John's day; at Lughnas or the beginning of August, and on the first day of November, the celebration in each case beginning on the preceding eve, as already stated. Fire still holds an important place in the May-day and midsummer festivities, and Grimm states that in Wales, where a Keltic language is yet spoken, the "holy fires" are also lighted on the first of November.*

The worship of fire and of its glorious embodiment, the sun, was a form of religious belief at once so ancient and universal that the subject need not be here discussed. The system probably attained its highest development and greatest splendor in Persia in the east and in Ireland in the west, and in both countries, as well as elsewhere, an impressive ceremony of the ritual was the simultaneous extinction of every hearth-fire throughout the land, to be rekindled from the new fire solemnly lighted by the priests of the sun.

In Ireland the great festival of the new fire took place on the eve of Bealtuine, and the first fire was kindled by the druid priests either on the hill of Uisneach, which occupied a central position in the kingdom, or upon the hill of Tara, where stood the royal palace of the monarch.† Both hills are in the county Meath. As soon as the blaze appeared above the trees other piles were lighted on the surrounding hill-tops, until in a short time the circle of fire ran round the whole island. Death was the penalty for lighting a fire before the great one was kindled by the druids in Meath. Smiddy, who has investigated the druidic religion to some extent, is inclined to think that this new fire was procured from the rays of the sun by some simple mechanical apparatus, but as the ceremonies took place at night, it is difficult to see how it could have been obtained in this way, unless the fire was actually lighted before darkness came on, which does not appear to have been the case. It is more probable that fire was obtained by the friction of two pieces of dry wood, the method still in use among primitive peoples, and often retained in religious ceremonials after it has been superseded in every-day life by some more convenient invention. The particular method used was probably the twirling of a stick in a solid block or wheel of wood until sufficient heat was produced to ignite the

* Grimm, *Mythologie*, 1, 590.

† Smiddy (*Essay on the Druids*, 97) favors the first location, while other writers think Tara more probably the true one.

tinder placed at the point of contact. This was the process used by the Roman vestals, by the ancient priests of India and by their modern Brahmanic successors, and has even been practiced in the western islands of Scotland, one of the last sanctuaries of druidism, as late as 1767, in order to procure sacred fire with which to check a murrain amongst the cattle.*

According to Smiddy, as soon as the new fires wer blazing on every hil, "Feasts and sacrifices followed. Victims were given to the flames, and among them probably were included human beings. As on all other occasions of prayer and sacrifice, both priests and people placed themselves at the west of the fires, with their faces turned to the mystical and magical east. Most probably these ceremonies took place at an advanced hour of the night and were continued till morning, when the sun, the great form of Beal, appeared in his glory above the horizon. * * * It is stated that from the fires lighted by the druids on this solemn occasion the people carried home burning brands or live embers, with which to rekindle the domestic hearths, and that the seed of it, *siol na tinne*, was preserved and continued among them till the next anniversary of Beil-tinne again. * * * The druids believed that in this way they kept the sacred fire of Beal perpetually burning and that great were the benefits which their people derived from its presence and influence among them. Even the fields at this season received portions of it to ensure a fruitful year and an abundant harvest."†

The great ceremony of Bealtuine was intended especially to bring a blessing upon the crops and herds, and it is stated by some authors that both human beings and cattle wer offered as a sacrifice to the fire upon this occasion. It is certain, at least, that two fires wer built close together and that men and cattle past between them, the purpose being to ward off the influence of disease.‡ In the last century the cattle wer stil driven through the May fires to preserv them from all disorders during the year,§ while the existing May-day beliefs concern themselvs chiefly with the safety of the milk and butter. The cardinal points derive their Gaelic names from the position assumed by the druids and people when paying the ancient homage to the rising sun. As the priest stood facing *soir* (*ser*), "the bright" place, his right hand was to the south, his left hand to the north and his back was turned to the west. The Gaelic names for south, north and west ar *deas*, *tuaigh* and *iar* (*jäs*, *thuee*, *eer*), signifying respectively, right hand, left hand and behind.

It is said that Saint Patrick first arrived in the neighborhood of Tara on the night when the people had assembled from all parts of the royal plain of Meath to celebrate the great Bealtuine, which, as it so happend, occurd this year upon the eve of Easter, and that the first intimation of the

* Grimm, Mythologie, i, 574-5; see also Kelly, Folk-lore, in his chapter on "The descent of fire."

† Smiddy, Druids, 94-7.

‡ Cormac (A. D. 908), noted in Grimm, Mythologie, i, 580.

§ Vallancey, Collectanea, ii, 276.

presence of the saint was given by the appearance of the blaze which he had kindled upon the adjacent hill of Slane in order to celebrate the offices of the Christian festival. In angry surprise the monarch asked who had dared to light that fire at a time when even the palace itself was in darkness, and received for answer from his druid that a stranger who revered not their ancient gods had kindled the fire, which, if not extinguished that night, would burn on forever. Thereupon the saint was summoned into the presence of the king, before whom he was examined, but, despite the warning of the druid, he was permitted to continue in the work which finally resulted in the overthrow of fire worship in Ireland.

The midsummer fires still burn brightly, but those of Bealtaine are nearly extinguished, which is probably due to the fact that on the introduction of Christianity the old celebration was superseded by that of Easter, when the ceremonies took place by day, thus rendering bonfires out of place. Moreover, as Easter is a movable festival, never occurring on the same day in consecutive years, it would become more and more difficult, under the new system, for the people to keep up the old accustomed periodic celebration. Within the last fifty years the May fires were still common throughout the south and east, and a Galway correspondent states that they were also lighted around Lough Corrib in the extreme west, but they are now confined chiefly to the counties of Limerick and Cork. The people gathered together with fiddlers and pipers to dance around the blaze as on Saint John's eve, and when the fire had burned low the cattle were driven through it to keep them from all sickness until the next May-day. In Kildare, in addition to the bonfire, a May-bush was set up and decorated with lighted candles. In the adjacent county of Meath the custom is now unknown, but seems to have been practiced at an earlier period. In the County Limerick the fires are still lighted as on Saint John's eve and the cows are sprinkled with holy water and burned with blessed candles and with blazing branches of white or black thorn from the pile, in order to keep them in health and insure plenty of milk and butter during the year.

Another old May-day custom is thus described as it existed in the south nearly a hundred years ago. The gilt ball mentioned was probably at one time a mystic symbol of the sun: "On the 1st of May all the young men assemble in their several districts, and go in procession, dressed out in ribbons, garlands, etc. The leader bears on a pole a double circle of hoops, in the centre of which hangs a gilt ball. They call at every house where a marriage had taken place since the last May-day. The new-married lady, together with a pecuniary present, presents another ball, which is, like the former, elevated on another pole. This last ceremony is only practiced in the south of Ireland."* This custom is described in Hall's "Ireland" (i, 167), already quoted, as still existing about forty years ago, although then nearly obsolete, and it is also stated that the May-pole carried was a tall tree, which was set up in front of the door, and around which the party danced in honor of the bride.

* E. W., quoted in Pop. Sup., 55.

In the city of Cork the celebration is held on "May Sunday," the first Sunday of May, perhaps because the working people are then more at leisure. For some nights beforehand parties of young men make secret forays upon the demenes of the neighboring gentry in order to secure tall, straight-growing oak trees, which are cut down and trimmed off to serve as May-poles. These are then carried into the town and set up in every convenient gathering place throughout the city. The poles are as high as a tall flag-staff and are firmly planted in the ground, but not decorated in any way. The work must all be done by night, as the whole business is an offense against the peace and dignity of the law, which woodrangers and police consider it their bounden duty to prevent. There seems to be a tacit understanding that the sports shall not be interfered with after the poles have been set up. On the evening of May Sunday small parties collect and proceed toward their respective poles, with numerous tar-barrels placed upon doors which are borne upon the shoulders of the men, while on other doors carried in the same way are placed chairs in which are seated a piper and fiddler. With music playing and shouts and laughter ringing out on the air, they march in this fashion to the pole, and, on reaching it, the barrels are piled around its base, together with a plentiful supply of turf. The musicians are then installed on a temporary throne, the pile is lighted and the dance begins, to last until daybreak. Parties from different poles pay mutual visits to each other during the night, each party headed by a musician, and dance three times around the pole of the party visited. As the poles are green they are but little injured by the fire and are afterward cut down by those who procured them and sold for a few shillings apiece, the proceeds being spent for drink or other refreshments. A small collection is also taken up outside the church in the morning to pay the musicians.

Another May eve observance in this city is thus described as it existed forty years ago: "Another old custom prevails also to some extent. May eve, the last day of April, is called 'Nettlemas night;' boys parade the streets with large bunches of nettles, stinging their playmates and occasionally bestowing a sly touch upon strangers who come in their way. Young and merry maidens, too, not infrequently avail themselves of the privilege to 'sting' their lovers; and the laughter in the street is often echoed in the drawing-room."*

Fire is held sacred in Ireland, and there are a number of May-day beliefs connected with it. None will be given out of the house on this day for any consideration, as such an act brings all kinds of ill fortune upon the family, and especially enables the borrower to steal all the butter from the milk, so that any one who should ask for the loan of a lighted sod of turf on May-day would be regarded as a suspicious character, whom it would be just as well to watch. To give out either fire or salt on this day is to give away the year's luck. One old writer states that fire would be given only to a sick person, and then with an imprecation, but the butter,

*Hall, Ireland, i, 25.

if stolen, might be recovered by burning some of the thatch from over the door. In the city of Limerick the fire is always lighted by the man of the house on May morning, as it is unlucky to have it done by a woman.

According to Lady Wilde, "If the fire goes out on May morning it is considered very unlucky, and it cannot be rekindled except by a lighted sod brought from the priest's house. And the ashes of this blessed turf are afterwards sprinkled on the floor and the threshold of the house."* The same author asserts that milk is also poured on the threshold, and that if a traveler should ask for a cup of milk he must drink it in the house, and with a pinch of salt in it, for no fire, water, salt or milk must be given out on this day.

Owing to the scarcity of timber the May-pole has long since disappeared from Ireland, excepting in a few isolated districts, chiefly in the south, altho it was once known to all Keltic countries, and was found in Britain as early as the Roman invasion. At Maghera, in the extreme northern county of Derry, the May-pole was annually planted in the market place until 1798.† The custom has even been carried across the Atlantic by the emigrant French, and "*un mai*" is frequently planted on the shores of the Saint Lawrence in honor of some local celebrity.‡ The tree or pole decorated with garlands was an appropriate symbol of the spring, and the peculiar dance around it may have had some reference to the circuit of the sun in the heavens. In Ireland and in Gaelic Scotland the dancers always follow the course of the sun from right to left, and one who takes the contrary direction is quickly told to "dance with the sun." Two hundred years ago, in districts where timber was plentiful, tall poles were set up on May eve, and allowed to stand nearly the whole year, while in front of every door was placed a green bush decorated with yellow flowers (buttercups?). §

The May-bush, trimmed with flowers, is still more or less general throughout the country, especially in the south. In Meath, in addition to setting up the May-bush, the children formerly strewed flowers in front of the doorway, while in Kildare, as already stated, the bush was decorated at night with lighted candles. In Clare, Galway and other parts of the west, a branch of the rowan tree (*crann caoran*) is put over the doorway or planted in front of the house, and is known as the *Cráinín Bealtuine* (*Craonyeen Bawthienny*) or "little May-tree." In some mysterious way the *crann caoran* has power against all spells of witches or fairies, who are uncommonly active on May-day, for which reason branches of the tree are put in the haggart or in the fields on this occasion, while smaller twigs are twisted around the churns and milking vessels, to protect the crops and the butter. The same custom, as it exists in Sweden and Germany, is

* Lady Wilde, i, 201.

† Quoted from the "Parochial Survey of Ireland," in *The Folk-lore Journal*, ii, 212, London, 1884.

‡ Bender, "Holidays of the French Canadians," in *Magazine of American History*, xx, No. 6, p. 467, New York, December, 1888.

§ Piers, Westmeath, 123.

described by Kelly,* who identifies the rowan with the Sanskrit palasa, which, according to the Vedas, sprang from a feather dropt by the fire god Agni, who had assumed for a time the form of a falcon. This, again, brings us back to the old fire worship.

The old May dance is thus described by Lady Wilde: "At the great long dance, held in old times on May-day, all the people held hands and danced round a great May-bush erected on a mound. The circle sometimes extended for a mile, the girls wearing garlands and the young men carrying wands of green boughs, while the elder people sat round on the grass as spectators and applauded the ceremony. The tallest and strongest young men in the county stood in the centre and directed the movements, while the pipers and harpers, wearing green and gold sashes, played the most spirited dance tunes."† This dance, equivalent to the May-pole dance of England, has long been discontinued on May-day, altho a similar "long dance" is stil performd in the north around the fire on Saint John's eve.

At Finglas, near Dublin, there was formerly an annual May fair lasting several days, which was celebrated on a grand scale, and was attended by great crowds from the city. The fair was presided over by a queen, drest in gorgeous apparel and wearing on her head a royal crown, and attended by a company of maids and courtiers arrayd in the same splendid fashion. But the fair finally degenerated into an occasion of reckless dissipation, so that it was discountenanced by the respectable citizens, until, about fifty years ago, when the last queen died and the royal show of Finglas came to an end.‡ This custom of a May queen, which does not appear to hav existed elsewhere in Ireland, may hav been introduced by the Danes, who for several centuries held possession of the country about Dublin.

The May boys ar an important feature of the celebration on this day, especially in the west and south. Companies of young men and boys, sometimes as many as a hundred or more together, drest up with ribbons on the arms and shoulders, and gay sashes about the waist, and sometimes wearing fantastic masks made of cloth or paper, march about the country, headed by pipers and fiddlers, who ar often assisted by some of the company with improvised instruments. On coming to the house of a rich farmer or gentleman they halt and sing May songs and perform a dance to the sound of the music, receiving in return a treat or a small sum of money. The dance is generally enlivened by the antics of a "fool," who has his face smeard over with flour and wears a bladder for a skulcap, while, at the end of a long pole, he carries another, with which he keeps order among the noisy spectators. Another fantastic character, drest in woman's clothes and known as the "ape," acts as assistant to the fool.

Several of the May-day beliefs in relation to the dairy hav already been

* Kelly, Folk-lore, 158-167.

† Lady Wilde, i, 195-6.

‡ Hall, Ireland, ii, 345.

mentioned, but these by no means exhaust the list. This is the day above all others when witches and fairies work their spells, and, if the proper precautions are not taken *before sunrise* to defeat their evil designs, there will be no luck in the family and no butter in the churn for the rest of the year. Wo to the hare that is found in the pasture on May-day, for it is well known to be a witch who has assumed this form in order the more easily to accomplish her wicked purposes. One of the best safeguards is to get the clay which collects in the split of the cow's hoofs when she is driven out on this morning, put it under the churn with a coal of fire and some salt, and then proceed with the churning. After this the butter is safe for the year, provided the churning be done before sunrise. If a twig of rowan or whitehorn, gathered on the preceding eve, be twisted about the churn, so much the better, and, to make doubly sure, it is just as well to have the churn-dash also made of rowan. A piece of iron is sometimes kept red hot in the fire while the churning is going on—another instance of the use of the combined forces of fire and iron against evil influences. Should the witch get the first clay from under the hoof and moisten it with three drops of the same cow's milk, secretly obtained, and place it under her own churn while churning, she can draw all the butter of that cow to herself. According to Lady Wilde, primroses gathered before sunrise are also strewn about the house and tied in bunches to the cow's tail on May-day to ward off the fairy influence.* The same author also mentions a traditional snow-white heifer which sometimes appears amongst the cattle on May-day, and always brings the best of good luck to the farmer.†

In Donegal, and probably in some other parts of the country, no housekeeper wishes to be first to light a fire on May-day. This seems to be explained by a story told as a fact by a Limerick woman. According to her account, a woman who was suspected of being a witch was observed going out to the spring well early one May morning. The priest followed her and concealed himself near the well. He saw her perform some spell with the water, after which she waited until she saw the first smoke rise from a neighboring chimney, when she said: *Im an deatac' sin agamsa* (*Im an dhóthakh shín ó'gamsa*), "Butter of that smoke to myself." Soon the smoke rose from another chimney, and he heard the witch mutter: *Im an deatac' sin cumu leis* (*Im an dhóthakh shín cumma lesh*), "Butter of that smoke with it likewise." By this time the priest's housekeeper was stirring at home, and soon a third column ascended from his own chimney. "*Im a t-sagairt cuma leis* (*Im a thógarch cumma lesh*), "The priest's butter with it, too," said the witch; but this was too much for the good man, who sprang from his concealment and laid his riding-whip across her astonished shoulders. This broke the spell so far as his own butter was concerned, but she got that of the others.

The crops are sometimes stolen as well as the butter. The evil-minded

* Lady Wilde, 1, 197.

† *Ibidem*, 1, 195.

person who knows how to invoke the aid of the spirit of darkness goes secretly early in the season to his neighbor's field and sows a handful of grain in some out-of-the-way spot where it is not likely to attract attention. Then by going before sunrise on May morning and reaping it, he is able to take to himself the greater part of that year's crop. A Clare man told how, when a boy, he was once walking with his father through their field of oats just before May-day, when they came upon the witch's tuft in a corner. His father got a spade and, taking up the bunch of oats by the roots, threw it over the ditch, and thus saved his crop. In connection with the crops, Sir Henry Piers, writing in 1682, says that in Ireland May-day was considered the first day of summer, and on this day, whatever else they might have, all, even the rich, prepared a dish of stirabout. This was regarded as an evidence of the wife's good management in making the grain last until the beginning of summer, as it was thought that if they could do so well, they could then very easily get along with the new provisions until harvest.*

The fairies are very active at this season, especially on May eve, when they change their quarters from one district to another, and the sound of their music and dancing may then be heard in every green fort by any mortal who has the courage to venture near. Some of the sweetest of the Irish tunes have been learned in this way from the fairy pipes, but of the many who have stooped to listen to the spirit music, few have ever returned to their friends. On May morning, also, enchanted cities, long sunk below the sea, are seen to rise once more above the waters in all their old-time splendor, and O'Donoghue, of Killarney, emerges from his subaqueous palace and rides across the surface of the lake on a snow-white horse, attended by all his retinue of knights and maidens.

While every one else is on the alert, it may well be supposed that the girls are not idle, and, in truth, most of them are anxiously consulting the oracles in regard to their marriage prospects. Before going out the door in the morning, the maiden recites a charm, and the first man or boy met on the road after this will bear the Christian name of her future husband. The first snail found before sunrise will be of the color of his hair, while its track upon the ground will mark out the initial of his name, but if the snail has a "box" or shell, the predestined partner will be a widower. The snail is taken home and put upon a plate in the sun, where it crawls about for a while and finally stops facing the direction whence the lover is to come. According to Lady Wilde, a black snail met first in the morning is unlucky and an omen of death, while a white one brings good fortune.†

The young women do not trust entirely to the oracle, however, but take some precautions of their own, chief of which is to bathe the face in May dew before the sun rises and to dry it with the hair. This renders the

* Piers, Westmeath, 121.

† Lady Wilde, i, 198.

features fair and beautiful, and also prevents headache and fevers during the year. An old riddle thus alludes to this custom :

" I washt my face in water that never rained or *run*,
And dried it on a towel that never was woven or spun."

In the north, the girls on May morning recite a charm called the "comedher" to attract the lover. The name is, probably, a corruption of "come hither," and when a young man appears to be fascinated by a girl, she is said to have put her comedher on him. There is a wonderful virtue in the dew which forms on May morning, when gathered before sunrise, and some of the knowing women do a thriving business in this line. The May dew is frequently preserved in bottles and rubbed on sores, in the name of the Trinity, to quicken the healing process. Herbs gathered on May eve possess mysterious powers for good or evil, according as they are pulled in the name of the Trinity or of the devil, and the virtue of the preparation is increased when compounded with butter made on May morning. It may be of interest to Americans to learn that many of these old May-day charms are still known amongst the mountaineers of the Southern Alleghenies, who have long since lost most of the folk-lore inherited from their transatlantic forefathers.

There are a number of miscellaneous customs and beliefs connected with May-day. In many parts of the country, it is considered unlucky to do any regular work, but the day is spent in mending the fences. This custom is, perhaps, akin to the former English ceremony of surveying the parish boundaries about this time,* a practice, probably, as old as the Roman Terminalia, or feast of Terminus, the god of fields and boundaries. In Kerry, and probably throughout the south, this is also the day for "settling the dues," or arranging what stock shall be kept by each of the partners in a common pasture. In making this settlement, the unit of measurement is called a collop, the name applied to a sufficiency of pasturage for one cow, † which is held to equal the amount required for eighteen geese, six sheep, hogs or asses, or two mules, while a horse is equivalent to a collop and a half. Thus, if one man pastures six sheep in a field, his partner has the right to put in as many asses or eighteen geese, while a single horse is held to consume as much pasturage as nine sheep. Goats are not put into the calculation, being usually sent to range the uncultivated mountain slopes. The pasturage sufficient for a sheep, hog or ass is called a due, and according to this primitive agricultural table, three bills (of geese) make a mouth or due, and six dues make a collop.

In Clare, a ribbon is left out on May eve, and according as it is found to have lengthened or shortened in the morning, so will the prosperity of the family increase or decrease during the year. In Cork, the sun dances in the water on this morning as well as on Easter, and it was formerly the

* Just before Holy Thursday, near the end of the Lenten season; see Brand, *Antiquities*, i. 197.

† Gaelic *collt'ac*, a cow, calf or heifer.

custom to go early in the morning to Sunday's wel, a noted wel near that city, to observ it. A girl born upon this day wil prove to be of a bad disposition, while a cow born at the same time wil be vicious and inclined to gore. Omens ar also drawn from the way in which the wind blows. According to Lady Wilde, ashes ar sprinkled on the threshold on May eve, and if in the morning there be found the print of a foot turnd inward it betokens a wedding, but if turnd outward, a death.*

Grimm, in his interesting subchapter on fire,† notes the fact that in the Germanic countries the Easter or May-fires ar almost entirely confined to the northern provinces, while the midsummer or Saint John's fires belong to the south. Almost every detail mentiond in this paper in connection with the May-fires in Ireland is described by him as a part of the modern Easter celebration in Germany, Denmark or Sweden, while precisely similar ceremonies wer enacted at the ancient Roman festival of the Palilia, which occurd about the same time of the year, viz., April 21. In the festival of Easter, as celebrated in Germany, with its bonfires and dances upon every hil and its lighted tapers in the churches, he sees only a Christian adaptation of the old pagan Bealtuine, or, possibly, of the midsummer feast, which the missionaries wer obliged to incorporate into the service of the new religion, while the very name is derived from that of the heathen goddess Ostara, whose festival was, probably, celebrated about the first of May. In regard to this connection, Grimm says: "Wurden seit der Bekehrung die Deutschen Maifeuer auf Ostern und Johannis verlegt, um sie christlichem Cultus naeher zu bringen? Oder ist, da auch Sonnenwende tief im Heidenthum wurzelte, bloss Osternzeit Stellvertreterin fuer das alte Maifeuer?" and again: "Thren Namen (Ostara) und ihre Feuer, die vielleicht in Maianfang fielen, verlegte man, nach Bekehrung der Sachsen, auf das christliche Fest." ‡

WHITSUNTIDE.

Whitsunday, in Gaelic calld *Cingéis* (*Cingeesh*), is a movable festival occurring generally about the end of May or the beginning of June, and deservs notice on account of the mysterious fatality connected with it, as wel as with the following Monday and Tuesday. It is an unlucky season, and should a man born on any one of these three days ever throw a stone it wil inevitably kil or cripple some one. No water must be soild during the same period, and for this reason no clothes ar washt from Saturday until Thursday, nor ar any sheep washt for shearing. Neither must one start on a journey or begin any important work, but, above all, no one must go near the water, either for bathing or boating, or even to cross a stream, for at this season one may be drown'd in a cup of water. There ar ancient legends to prove the truth of this belief, and every old woman can tel of instances within her own knowledge where a neglect of these

* Lady Wilde, i, 199.

† Grimm, *Mythologie*, i, 567-597.

‡ *Ibid.*, 581 and 583.

precautions has resulted fatally. Death is not inevitable, however, for only one hour of all this time is fatal, but as no one may know which is the hour, or even on which of the three days it occurs, the only way to avoid the evil consequences is to observe the prohibition until the period has terminated. According to Lady Wilde, the fairies are also to be feared at this season, so that holy water must be sprinkled about the house to keep them away, and at this time also the water spirits come up out of the sea to hold their revels on the shore, and the water-horse rises from the lough to graze at midnight in the green pastures upon its banks.* A dance was formerly held also on Whitsunday, as already described in speaking of Easter Sunday.

SAINT JOHN'S EVE, JUNE 23.

Next comes Saint John's eve, June 23, better known, perhaps, as midsummer night, after which the sun begins its backward course and the days grow shorter. This was one of the most solemn festivals of the ancient pagan world, and numerous vestiges of it still exist throughout the greater part of Europe, after nearly two thousand years of Christianity. In fact, such a hold had the old fire worship upon the minds of the people that in many instances, especially in Germany, the teachers of the new faith found it necessary to incorporate the pagan ceremonies into the accepted rites of the church.† In France, Germany, Austria, Italy and the Slavic countries, the observances connected with this festival are practically identical with those in Ireland. In Servia and the other south Slavic countries, according to Krauss, the very names of Saint John's day and Saint John's fire "wie elektrische Funken im Herzen und Gemüthe des südslavischen Bauernvolkes tausend tolle, lebenslustige, verliebte und glückliche Gedanken entzünden! Wann um mitternächtlicher Stunde auf steiler Höhe der mächtig aufgeschichtete Holzstoss hellloodernd gen dunkelblauen sternebesäeten Himmel harzduftende Feuerflammen züngelt, da tanzen Burschen und Mädchen jauchzend und singend um das Feuer gar schnellfüssigen Reigen. Zauberhaft die Nacht, die Feuergluth, zauberhaft der schnelle Reigen, Alles ist bezaubert, Alles zaubert."‡

As has been stated, the fires of Bealtuine have paled before the Easter tapers, but the midsummer fires still blaze from every hill-top in Ireland on the eve of June 23, now called in Gaelic, *Oid'e'e Tein' Seagan* (*Eha or Eel Chin Shawn*), or the "Night of John's Fire." The introduction of the new calendar in 1752 seems to have caused some confusion for a time,§ but this can have been but temporary. Speaking of the old fire worship, Smiddy says, in this connection: "There was a sort of poetry and of mystery about this system, which certainly exercised a powerful fascination over the human mind. The altar and the cairn of the Druid have

* Lady Wilde, 1, 204-5.

† See Kelly, Folk-lore, 46-8.

‡ F. H. Krauss, *Sitte und Brauch der Südslaven*, 176, Wien, 1885.

§ Writer quoted in Brand, *Antiquities*.

been deserted for ages, and yet, to this day, there are living vestiges and memorials of his anniversary fire in Ireland. At a certain period of the summer, when the shades of evening gather over the face of the land, flames of fire are seen to spring like magic from hill to hill, through the whole expanse of the country. They are also lighted in the hamlets and villages and in many of the towns. A few of these take place at Beilinne, that is, at the beginning of May; but the great blaze is reserved for the eve of St. John the Baptist, the 23d of June."*

In pre-Christian times the first fire was lighted on the hil of Howth, on the east coast of Ireland, near Dublin, and the moment the flame appeared through the darkness a great shout went up from the watchers on all the surrounding hil-tops, where other fires wer quickly kindled until soon the whole country was in a blaze †

The modern ceremonies hav changed but little in the last two centuries. Sir Henry Piers, writing in 1682, says that on this eve there was a bonfire in every town, and that the people carried about blazing torches of dried rushes, so that "a stranger would go near to imagine the whole country was on fire."‡ Another author quoted in Brand, writing in 1723, says, "they make bonfires and run along the streets and fields with wisps of straw blazing on long poles to purify the air, which they think infectious, by believing all the devils, spirits, ghosts and hobgoblins fly abroad this night to hurt mankind."§ These bundles of straw tied to long poles ar calld "clears," and the custom is stil kept up. ¶

It is here in place to say something in regard to the word *bonfire*. As commonly pronounced and as given in the dictionary the word is bonfire, and is derived by most etymologists from the Teutonic *boen* or blessing. It seems probable, however, that the original form and meaning was *bonefire*. The word is so pronounced in the English-speaking districts of Ireland—where many archaic English forms ar preservd—and the Gaelic name, *tein'na enam'* (*chin na enaw*), means exactly the same thing. This may indeed be a mere translation of the English name, but such does not appear to be the case. Kelly, writing upon the midsummer fires, gives the account of a mediæval author as follows: "The bonfires, he says, were lighted for the purpose of scaring away the dragons that poisoned the waters with the slime that fell from them at that hot season, and therefore bones and all sorts of filth were thrown into the fire, that the smoke might be the fouler and more offensive to the dragons."¶ In several parts of the west of Ireland, especially in Connemara, the bones are stil saved up to burn in the midsummer fires.

The piles for the Saint John's fires ar built of turf, bog deal and furz,

* Smiddy, *Druids*, 97-98, 1, 304.

† Lady Wilde, 1, 214.

‡ Piers, *Westmeath*, 123.

§ Brand, *Antiquities*, 1, 305.

¶ See quotation from the *Parochial Survey of Ireland*, in the *Folk-lore Journal*, II, 213, London, 1884.

¶ Kelly, *Folk-lore*, 57.

with sufficient green stuff to prevent its burning too rapidly. The fire is generally lighted after dark, but in some parts of the north it is kindled in the afternoon. The people gather about the fires with pipers and fiddlers, and the evening is given up to dancing and merry-making. In Meath the young folks were allowed on this night to milk the sheep in the pastures, and came provided with buckets for the purpose, together with oaten bread to dip in the milk, which was boiled over the fires in regular picnic style. The next morning was considered the proper time to hunt mushrooms. It was also customary to walk three times round the fires, reciting certain prayers to ward off sickness during the coming year. In Down the festivities began in the afternoon, when the people went in procession, carrying an effigy called a "Paddy," and danced round the fire to the music of a fiddler. In the Orange districts it was sometimes necessary, thirty years ago, to put out an armed picket to prevent interruption. On asking an old man where the guards got their guns, he said, "We hadn't many, but we had more than the law allowed." As the fires burn low, the young men leap over the blaze, and later on the girls and women walk across the hot embers. Long after midnight, when the pile has burned down to the ground, the people disperse to their homes, some one of each family carrying a shovelful of live coals to scatter over the fields in order to insure a good crop, with a lighted sod of turf to put into the hearth-fire, to bring down prosperity upon the household. It is also an omen of a good crop to be able to reach the field with a burning brand before the embers have time to go out.* In the city of Dublin, where bonfires could not well be kindled, it was customary in the last century to set up a bush in the middle of the street and adorn it with lighted candles.†

Connected with this celebration are several local customs which were probably more general in former days. At Armoyn, near Ballycastle, County Antrim, the people join hands about a blessed well in a game known as "Round Ring," and much resembling "Hunt the Handkerchief." One standing on the outside touches some person in the circle, who then lets go his partner's hands and runs round the ring in pursuit of the first, who endeavors to get into the vacated place before he can be caught. If successful, the other takes his place outside the circle until released in a similar manner.

In Kerry, and other parts of the west, as the fires burn down, the people pull out blazing brands from the pile and singe the cows with them, in order to bring increase to the herds. The cattle are sometimes chased through the fields, at other times collected into pens for the purpose. In former times they were driven round or through the fire, as on May-day, a custom which still existed in the north within the present century.‡

* Charles DeKay, *Fairies and Druids of Ireland*, in *Century Magazine*, xxxvii, No. 4, 507, New York, Feb., 1889.

† E. W. (1791), *Pop. Sup.*, 55.

‡ *Parochial Survey of Ireland*, quoted in the *Folk-lore Journal*, ii, 140, London, 1884.

Coals from the Saint John's fire are also sewn into the clothes of women to prevent their being carried off by fairies. According to Grimm, a ceremony similar to this singeing or passing of the cattle through the fires on Saint John's eve exists also in France, Germany, Russia, Bohemia and Servia,* but the writer has not been able to learn of the existence in Ireland of the custom mentioned by the same author in this connection, of throwing flowers into the fire or putting herbs over the doorway of the dwelling house or stable.

A writer quoted in the *Gentleman's Magazine* for 1843, in describing a celebration witnessed on Saint John's eve in the King's county, mentions one curious feature, which is evidently a local substitute for driving the cattle through the fire, and which closely resembles a Christmas custom in Wales, another Keltic country, as described in the same article. After speaking of the brilliant effect of the bonfires blazing on every hill, the author continues :

"But something was to follow that puzzled me not a little ; when the fire had burned for some hours and got low, an indispensable part of the ceremony commenced. Every one present of the peasantry passed through it, and several children were thrown across the sparkling embers, while a wooden frame of some eight feet long, with a horse's head fixed to one end and a large white sheet thrown over it, concealing the wood and the man on whose head it was carried, made its appearance. This was greeted with loud shouts of 'The white horse !' and having been safely carried by the skill of its bearer several times through the fire with a bold leap, it pursued the people, who ran screaming and laughing in every direction. I asked what the horse was meant for, and was told it represented all cattle." †

Saint John's eve is also a favorite fairy season, when the "good people" hold their midnight revels in every green fort. That the same belief existed in England is evident from Shakespeare's "Midsummer Night's Dream." On this night especially the fairies are on the watch to carry off incautious mortals, particularly women and infants who are not protected by a sprig of *lusmór* (foxglove), or some other safeguard against fairy influence. An old writer of 1723, quoted by Brand, mentions a belief that on this eve every human soul leaves its bodily habitation and takes a journey to that place on land or sea where death shall finally separate them forever. ‡ This is also a chosen time for visiting many holy places, especially the numerous wells called after Saint John. §

The following account of the celebration, as still carried out in the west, is given by Lady Wilde: "The fires are still lighted on St. John's eve on every hill in Ireland. When the fire has burned down to a red glow,

* Grimm, *Mythologie*, i, 588-591.

† *Pop. Sup.*, 90.

‡ Brand, *Antiquities*, i, 305.

§ See the author's "Medical Mythology of Ireland," in *Proc. Am. Philos. Soc.*, xxiv, No. 125, 152, Philadelphia, 1887 ; also, Hall, *Ireland*, iii, 117, note.

the young men strip to the waist and leap over or through the flames ; this is done backwards and forwards several times, and he who braves the greatest blaze is considered the victor over the powers of evil, and is greeted with tremendous applause. When the fire burns still lower, the young girls leap the flame, and those who leap clean over three times, back and forward, will be certain of a speedy marriage and good luck in after-life, with many children. The married women then walk through the lines of the burning embers ; and when the fire is nearly burnt and trampled down, the yearling cattle are driven through the hot ashes, and their back is singed with a lighted hazel twig. These hazel rods are kept safely afterwards, being considered of immense power to drive the cattle to and from the watering places. As the fire diminishes the shouting grows fainter, and the song and the dance commence ; while the professional story-tellers narrate tales of fairy-land, or of the good old times long ago, when the kings and princes of Ireland dwelt amongst their own people, and there was food to eat and wine to drink for all comers to the feast at the king's house. When the crowd at length separate, every one carries home a brand from the fire, and great virtue is attached to the lighted *brone* which is safely carried to the house without breaking or falling to the ground. Many contests also arise amongst the young men, for whoever enters his house first with the sacred fire brings the good luck of the year with him." *

SAMHAN, HALLOW E'EN, OR ALL SOULS' DAY, NOVEMBER 1.

We will pass over several minor dates, chief among which is Lady day, on the fifteenth of August, nearly corresponding with the ancient festival of Lughnas, which has given its name to the month, but has now faded from the popular recollection. Next comes the great festival of Samhan, or November eve, called in the eastern districts Hol' eve, and better known in this country as Hallow e'en, the eve preceding the first day of November, designated in the calendar as the day of All Saints. This appears to have been a universal festival throughout pagan Europe in honor of the goddess of fruits, † which probably accounts for the prominent part played by the apple in the modern celebration. So firmly were the people wedded to this pagan festival that the church was compelled to incorporate it into the Christian calendar, merely changing the name so as to give it a new significance.

The Gaelic name of this festival is *Sam'an* (*Sowan*), November being called *mi na Sam'ain*, the month of Samhan. In ancient Ireland it was the last of the five great fire festivals. Vallancey states that the festival was dedicated to the god of fruits and seeds, and lasted throughout the month of November. ‡ The only trace of fire worship remaining in con-

* Lady Wilde, i, 214-5.

† Hutchinson. "Northumberland," quoted in Brand. Antiquities, i, 378.

‡ Vallancey, Collectanea, iii, Part ii, 443 *passim*.

nection with the modern celebration in Ireland is in the use of lighted candles, but in Scotland and Wales bonfires wer stil kindled with mystic rites a generation ago, while the same custom prevailld also in England at an earlier day.* Smiddy states that the ancient Irish celebrated the day with sacrifices and feasts, and that "the horse was offered as a victim to the sun, and perhaps the human being, too." On this occasion, also, special honors wer paid to the great idol of Crom Cruach, which was set up at a place calld Magh Sleachta, supposed to hav been in the County Leitrim, and which is described as a stone capt with gold and silver, and surrounded by twelv other rough stones. To this idol, until its destruction by Saint Patrick, wer sacrificed the first born of every species, and on the great day of Samhan the people prostrated themselvs before it until the blood streamd from their lacerated faces, knees and elbows. The figure evidently had an astronomic significance. The festival partook of the character of a thanksgiving for the ripend fruits. †

The feast of Samhan was the occasion of the convening of the Feis, or great national assembly of ancient Ireland, which was held every three years at the palace of Tara and lasted for a week, being convoked by the monarch himself three days before the day of Samhan (November 1) and continuing three days after. According to the annalists, this assembly was instituted by Ollamh Fodhla (pronounced Ollav Fola), the first monarch of Ireland and builder of the palace of Tara, who is said to hav flourishd nine hundred years before Christ. The purpose of the convocation, which was attended by all the druids, bards, rulers and scholars of Ireland, was to enact laws and revise the annals of the country. The first two days wer devoted to friendly intercourse, and on the third the assembly was formally opend by the chief bard with music and the recitation of poetry. The sacred fire of Samhan was then lighted and the favor of the gods invoked, after which the regular business of the convention began. Whoever was convicted of murder, theft or quarreling during this period sufferd death, tho at other times punishd only by a fine. ‡

With regard to the modern celebration of November eve,§ it may be stated briefly that almost every practice or belief found in Ireland is common as wel to England, Scotland, Germany and other countries of Europe, while, as on May eve, the chief purpose of the mystic rites is to discover to the girls the names and characters of their destind partners. Unless otherwise noted, it may be assumed that the customs about to be described exist in some form throughout the country. The apple is the great feature of the occasion, and is made to contribute in a number of ways to the general enjoyment. Apples ar provided in abundance in every farmer's house, and a favorit pastime is ducking for them in a tub of water. The apple floats upon the water, and each one who makes the trial must kneei

* Brand, *Antiquities*, i, 388-390.

† Vallancey, *Collectanea*, iii, Part II, 457-8.

‡ Smiddy, *Druids*, 106-110.

§ Hall, *Ireland*, ii, 387 note.

down with his hands behind his back, and dipping his head into the tub, endeavor to bring up the apple in his mouth. As the apple is forced under the water at each attempt, unless he can succeed in seizing it between his teeth, it may readily be supposed that this simple play affords a vast deal of amusement to those gathered about the tub.

Sometimes an apple is suspended on a string, fastened at one end to the wall, while the other end is held by one of the company. The biter, with his hands tied behind him, tries to catch the apple between his teeth, while the other strives to defeat his purpose by jerking the string just at the critical moment. To render the feat still more difficult, the biter is sometimes compelled to bend backward over a stick resting on the backs of two chairs. Again, the apple is hung by a string from the mantel. Then each person runs with head down around a firkin placed in the middle of the floor, keeping his fingers on the firkin all the time until dizzy, and at last, straightening up, tries to take a direct course and hit the apple with his finger.

This last method seems to be a degenerate form of a more elaborate practice which still exists in the County Clare, as well as in the north, and may originally have had an astronomical meaning. A contrivance known as the "snap apple," and somewhat resembling the hub of a wheel with fifty-two spokes, is suspended by a string from the loft, at about the height of an average man's head. The spokes are arranged horizontally around the hub in several series one above another, and of every three spokes the first has a short candle blazing at the extremity, the second is sharpened to a point and the third has an apple stuck upon the end. Under it is placed a stool, around which a line is drawn upon the floor. While one person keeps the wheel revolving, each of the others in turn runs around in this circle, stooping down with one hand on the stool, as already described, as many times as there are spokes on the wheel, when he rises and endeavors to catch the apple, at the risk of being burned by the candle or scratched by the sharpened stick should he fail.

A writer of 1784, in the *Gentleman's Magazine*, speaking of this celebration in the eastern counties, says, that in his time an important part of the refreshment provided for the occasion was "lamb's wool," made by bruising roasted apples and mixing the pulp with milk, ale, or even wine amongst the upper classes who were not too refined to take part in these periodical merry-makings. Apples and nuts always accompanied the lamb's wool.* As far back as 1728, the Dublin servants were accustomed to demand apples, ale and nuts of their employers on this eve.† Another favorite dish on this occasion is culcannon, whence the festival is sometimes known as "culcannon night." It consists chiefly of potatoes and turnips boiled and mashed together, with a generous lump of butter swimming on the top.

Vallancey, also writing in the last century, states that in the south of

* Quoted in Brand, *Antiquities*, I, 396.

† Brand, *Antiquities*, I, 377.

Ireland, on this eve, the peasants "assemble with sticks and clubs (the emblems of laceration), going from house to house, collecting money, bread-cake, butter, cheese, eggs, etc., etc., for the feast, repeating verses in honor of the solemnity, demanding preparations for the festival in the name of St. Columb-kill, desiring them to lay aside the *fatted calf* and to bring forth the *black sheep*. The good women are employed in making the griddle cake and candles; these *last* are sent from house to house in the vicinity and are lighted upon the (Saman) next day, before *which* they pray, or are supposed to pray, for the *departed souls* of the donor. Every house abounds in the best viands they can afford; apples and nuts are devoured in abundance."* In a previous passage, he explains the allusion to the black sheep by stating that such an animal was formerly sacrificed by the druids on this occasion for the benefit of the souls of the departed. He also mentions several love charms which will now be described.

Quite a number of experiments are tried by the girls with beans or nuts to test the affection of their sweethearts. Sometimes two nuts are named after a pair of lovers and placed in front of the fire. If either cracks or jumps away from its place, the one whose name it bears will prove inconstant. Should it blaze up brightly, its namesake has an affection for the one represented by the other nut, and if the two burn quietly together the lovers will be married. In Kerry, the trial is sometimes made with beans, large ones being used to represent the young men, while smaller ones serve for the young women. If neither one of the pair jumps away from the other, they are lighted and allowed to burn to a coal, after which they are put into a glass of water. Should both sink, it is a sign that the lovers will be married; if neither, they will never be wedded; but if only one sinks, it is, as the people say, "between I will and I won't." Again, white beans represent the girls, and black beans for their lovers, are placed in pairs on a pan over the fire. If the black bean remains by the side of the white one, the girl knows her lover is true to her, but if it pops over to the neighborhood of another white bean, she knows that the recreant sweetheart has been won from her by the rival whose name the white bean bears.

The lover sometimes roasts ten beans, and then, throwing one of them over the shoulder and taking the other nine in the mouth with a sup of "mairn" water, he goes to three houses in succession and listens secretly on the outside.† The first name belonging to one of the opposite sex heard spoken inside the house will be that of the future husband or wife, as the case may be. If the same name be heard at the next and the third house the omen receives additional confirmation, but should a different name be heard in the second house, that will be the name of the destined

* Vallancey, *Collectanea*, iii, Part II, 459.

† The selection of ten objects, one of which is afterwards thrown away, is of common occurrence in Irish folk-lore, and will be met with again in this chapter. For another instance, see the author's paper on "The Medical Mythology of Ireland," in *Proc. Am. Philos. Soc.*, xxiv, No. 125, p. 144, Philadelphia, 1887. A "mairn"—properly mering—stream is a boundary ditch between two fields.

partner in case the other should die, and so on with the third. One old man admitted that he had tried this in his young days, at a time when he was paying some attention to a girl named Mary, whom, however, he had no intention of marrying. Sure enough, what name did he hear at the first house but Mary. He went on to the next, and again he heard the same name. Afraid to go to the third, he spit out the beans and the water, exclaiming in a passion, "To hel with Mary!" He finally fulfilled the prophecy by marrying a Mary, but a different one, of whom, at the time, he had no thought. His wife, who had been an interested listener, added, "No, but she was kind to you."

Two pieces of alum ar sometimes christend in the same way and placed together near the fire. If they melt or run together, it is a sure token that the fortunes of the lovers wil be joind, but otherwise, they wil never wed each other.

The young folks also go blindfolded into the garden at midnight to pull up cabbages, and according as these ar full or stunted, with straight stalks or crooked, so wil the future partner be of fine appearance or withered and misshapen, or neat or slovenly in habit. The stalk is taken home and placed over the door, and the first one who comes under it in the morning wil bear the Christian name of the destined husband or wife. The cabbage stalks ar sometimes thrown against the doors of the farmers.

Another mode of divination is by means of melted lead, which is poud through the ring of a key into a vessel of water drawn from a spring wel. The shape assumed by the metal on coming in contact with the water indicates the trade or occupation of the coming man. Each girl making the trial must hav a separate vessel of water, and the water must be brought and the operation performd in silence.

Three basins ar also ranged on a table, the first containing clean water, the second, calld the *baintreab'ae* (*bonchōrakh*) or "widow" containing dirty water, and the third fild with clay. With eyes closed or blindfolded, each girl then walks up to the table and lays her hand on one of the basins, and according as she touches the clean water, dirty water or clay, so will she find a handsome mate, an ugly husband or widower, or a grave before the end of the year. In the south, according to one authority, the basins ar fild respectivly with water, earth and meal, symbolic of long life, death within a year, or the attainment of wealth.*

In Limerick a cake is baked with a ring inside, from which omens ar drawn in the manner already described in treating of Shrove Tuesday.

Various devices ar resorted to in order to dream of the future husband, the method generally adopted being to eat something which wil cause intense thirst, in the belief that the apparition of the destined man wil come to the bedside of the sleeping girl at midnight and offer her a drink from a glass of water which has been placed conveniently near. Sometimes a cake containing a large quantity of salt is baked, and must be eaten in three

* O'Hanlon (1806), in *English Traditions and Foreign Customs*, Gentleman's Magazine Library, 29, Boston, n.d. (1885).

bites. Again it is a salt herring, which must be stolen and eaten, bones and all. Sometimes the girl takes ten pins, and, throwing one over her left shoulder, sticks the remaining nine into an apple, which she places under her pillow on retiring. But the most elaborate method of augury is that performed with the egg. For this purpose the first egg ever laid by a black hen must be procured and boiled until hard, when the yolk is taken out and the cavity filled with salt. On retiring at night the girl eats the egg and then gets into bed backward. A glass of water has been placed on the table at the bedside, but she must endure the burning thirst until the hour of midnight, when her destined partner will infallibly appear and offer her a drink. In no case must a word be spoken or a drop of water taken after eating the egg.

Hemp seed is also sown by the maiden, who probably repeats a secret formula at the same time, and it is understood that, on looking back over her left shoulder, she will see the apparition of her future spouse gathering the hemp. Akin to this is the practice of winnowing grain at the barn door, with the same result of seeing the figure of the destined husband before the task is ended.

Most of these methods of love divination, altho common enough, are considered somewhat uncanny, but those now to be described are regarded with undisguised horror, as being veritable compacts with the powers of darkness, and few can be found who will admit ever having tried them, while the majority profess ignorance of the whole subject.

Chief among these unholy rites is that known in Gaelic as *Tarruing na Sruit* (*Thöriñj na srüh*), or, "the dragging of the stream." The one who thus seeks the aid of the demons takes her smock, or, if a man, his shirt—the garment must always be that worn next the skin—and, going under cover of the darkness to a "mairn" stream, washes it in the water, drawing it always against the current, "*ann ainm an d'eam'ain 'sa d'iabail*,"* i. e., in the name of the fiend and the devil. The smock is drawn against the stream because the whole performance is believed to be in direct opposition to the laws of God. Returning to the house the girl sweeps the hearth clean, and then hangs the garment on a chair before the fire, expecting, just as the clock strikes twelve, to see the ghostly shape of her future husband enter the room and turn the smock. In some cases a razor and looking-glass are added in order that the lover may shave himself.

Still more terrible is the conjuration of the ball of yarn and the lime kiln. As described by one informant, the girl who dares risk the event of this awful spell goes at night to the nearest lime kiln—in which an oracular spirit is supposed always to reside—and in the name of the devil throws into it a ball of yarn, retaining one end of the thread in her hand. She begins to wind up the yarn, but soon feels a pull at the other end and asks, "Who pulls my yarn?" when the spirit within the kiln calls out the name of her future husband, whose figure she then sees rising out of the

* Pronounced, *An ainm an yowan sa yowl*.

pit before her, on which she must turn and run with all speed toward the house, repeating a terrible charm as she goes. The shape pursues her, but as it comes nearer it loses the appearance of her lover and becomes a horrible demon, uttering the most blood-chilling cries. Should it overtake her, the unfortunate girl would be torn in pieces, but if she can enter the house and lock the door before the monster comes up she is safe, altho in almost every case she falls on the floor in a dead faint from terror. Sometimes the baffled demon peers in through the window, but, strangely enough, no one but the girl herself can see the apparition or hear the horrible sounds. At the moment of the occurrence the future husband, whose spirit is thus made to appear, is conscious of some mysterious disturbance in himself, without being aware of the cause. The working of this diabolic spel always results unfortunately, and the children born to the girl after marriage ar almost certain to be idiotic or deformd.

A writer in the *Gentleman's Magazine* givs a somewhat different account of this ceremony. According to his statement, if the girl winds on and feels nothing pull at the other end, it is a sign that she wil die unmarried; if something pulls, she asks the question, when her future husband wil giv his name or appear to her, but sometimes a demon wil approach instead, and this is a token that her death is not far off.* Vallancey says that the Lord's Prayer is recited backwards while winding up the yarn on the ball.†

Lady Wilde hints mysteriously at another awful incantation performd in front of a looking glass in the devil's name—something so unspeakably fearful in its nature that one young girl who tried it was found the next night with distorted features lying dead before the mirror, while the glass itself was shattered in pieces. The same author continues :

"Another spell is the building of the house. Twelve couples are taken, each being made of two holly twigs tied together with a hempen thread ; these are all named and stuck round in a circle in the clay. A live coal is then placed in the centre, and whichever couple catches fire first will assuredly be married. Then the future husband is invoked in the name of the Evil One to appear and quench the flame. On one occasion a dead man in his shroud answered the call and silently drew away the girl from the rest of the party. The fright turned her brain and she never recovered her reason afterward."‡

This season is also a great time for fairies, ghosts and witches. In Connemara, the churn-dash is trimd with *crann caoran*, or rowan twigs, on November eve, to prevent the stealing of the cream by the witches during the coming year. The author just quoted also states that if the cattle fall sick about this time the blame is laid upon the witches.§

* O'Hanlon (1865), in *English Traditions and Foreign Customs*, *Gentleman's Magazine Library*, 20, Boston, n.d. (1885).

† Vallancey, *Collectanea*, iii, Part ii, 460.

‡ Lady Wilde, *i*, 209-210.

§ *Ibid.*, 211.

On this night it is dangerous to be abroad, and no one would think of telling a fairy story, because the fairies are then going in troops from one green fort to another, making merry with their elfin comrades and dancing to the sound until the first gray streak of day appears in the east. In Connemara, they carry about with them a golden halter, with which they are able to seize and drag off incautious mortals to their underground abodes, but he who is so fortunate as to get possession of this rope will thenceforward know the hiding-place of all the fairy treasures. Should any one meet a company of fairies on their travels and have the presence of mind to throw at them a handful of dust from under his feet, they will be compelled to release any mortal prisoner they may have with them.

On this night it behoves one to be on his guard against the puca, a hateful goblin monster, assuming by turn the form of a horse, a bull, a goat, or a dwarfish imp, with all the intelligence of a man and all the malice of a demon. From this Keltic name—alike in Gaelic and Welsh—is derived the English Puck. A favorite trick of the puca is to present himself in the guise of a gentle horse to some belated foot traveler, who is easily induced to mount in order the sooner to reach his journey's end. The puca sometimes facilitates the operation by approaching stealthily from behind and deftly inserting his head between the legs of the victim. Then begins a wild ride over hill and dale, through fields and across meadows, until at last the puca halts on the edge of a lofty cliff and with a sudden toss hurls his victim down upon the rocks below. On this night, also, it is said that he spoils the sloes and the blackberries, so that they are no longer fit to be eaten. The same belief, transferred to the eve of Michaelmas, September 29, is found also in Cornwall.*

While the fairies, the witches and the puca are thus abroad, the dead also leave their graves to revisit once more their former haunts and mingle unseen with the living. In order that they may be comfortable and know they are not forgotten on this one night in the year, their pitying friends sweep clean around the hearth and build up a good fire so that the ghosts may warm themselves after leaving their chilly graves, while food and milk in abundance are set out for their refreshment. At the same time the souls of the departed are especially remembered in the prayers of the living. Those, also, who are not dead, but in captivity with the fairies, are now permitted to return again to their old homes for a few short hours, and it is even said that the spirits of the dead join in the fairy revels on this one night of the year. Lady Wilde also states that "on November eve, by certain incantations, the dead can be made to appear and answer questions; but for this purpose blood must be sprinkled on the dead body when it rises; for it is said the spirits love blood. The color excites them and gives them for the time the power and the semblance of life."†

From one of Wakeman's charming Irish letters in the *Washington Evening Star*, we extract the following account of a recent November eve

* W. S. Lach-Szyrma, in *Folk-lore Journal*, i, 365, London, 1883.

† Lady Wilde, i, 207.

celebration in far-off Donegal. Altho somewhat lengthy, it comes all in good place and mentions several features not previously referd to :

“Of all brief periods of Irish pleasure, Hallowe'en yields the sweetest, because the most harmless and innocent, delights. It is the night of unbounded mirth, witching charm and sinless dream. It is then that the tenderest of all superstition's eerie broods, the kindly Irish fairies, mingle with human moods and wish, and weave their friendly spells through all the warp and woof of thought, emotion, dream and desire. And his is an insensate heart that will not grow younger and tenderer under the influence of those mirthful revels. Where will one begin and end in telling them as he sees and feels them? Over every door to house, room or barn, an apple-paring was hanging, and some maiden's eager eye was watching for him who first passed beneath, for that one the fairies had charmed as her beloved. Groups of lads on all-fours ducked their heads in buckets of water and brought out small coin with their teeth. Lasses were busy cutting out alphabets with which the fairies were to spell, in water basins, secretly-cherished names. Stolen herrings—which must be salt, must be broiled without turning, eaten with hot tongs, and dreamed on, 'without drink'—now made their appearance. Then the 'bannock-baking' and its wild merriment. Whoever turned the bannock on the huge griddle that hung from the crane was to wed her whose nimble fingers kneaded its oaten meal, salt, soda and water together. 'Nut-burning' and 'snap-apple' were going on merrily at the hob. The hazelnut ashes in dainty packets beneath the pillows yield charmed dreams; the burning 'snap-apples' tell whether loving pairs will sputter or mellowly age during wedded life. Then there was the 'dumb-cake' making for fairy-aided dreams; the 'charm-pies' with their buttons for old bachelors, thimbles for old maids, and rings for the lucky ones who should wed; the 'candle-and-sweets,' suspended and whirling between grinning faces where teeth snapped for bites, and luckless frowsy hair was singed; and an hundred other innocent delights, leading to the more serious affairs of 'postman's-knock' and 'forfeits,' where genuine old-fashioned kissing was there for the fighting; and the struggle for your 'rights' with a bouncing Irish lass from the mountains insured her hatred if you did *not* overcome her, and a sore body and broken bones if you did!—and then, amid deafening clatter and chatter, the supper in the great room, piled upon tables like fat stalls in a plethoric market, various, smoking, awful; but with the jolliest, hungriest crew you ever broke bread with in your life. And oh, for room in which to tell the tales here told, to give the songs here sung, to reproduce with all the delicious floriture the quips and jokes here perpetrated; while oceans of tea flowed gurglingly, and the poteen, clear as rock-water and as guileless of excise, went on its 'winding' way. * * *

'A hullabaloo without now arrested our attention. 'The byes' had planned a great surprise. Sallying forth when the tales and songs were at their height, they had descended upon another Hallowe'en party a few miles distant, and by main force had captured and brought a fiddler bodily

away, the whole crowd of defeated friendly rivals following after in prideful acclamation. And here they came with wild whoop and hurroo, carrying their prize on their shoulders into the great room, where the procession was received with ringing cheers. It was old Billy Drain, the blind fiddler, all the way from Belfast; hero now above all pedagogues and strangers; hatless, coatless, breathless from the odd melee, but with pursed and smiling mouth and positive radiance shining from his white locks and beaming from his blinking upraised and sightless old eyes. Was there a dance this Hallowe'en night at that farmhouse on the ancient Kilmacrenan road? Ask the rafters of oak that shivered a century's splinters and mould upon the vaulting heads and heels of this big-hearted Irish peasantry. And ask the stars that looked softly down until their shining eyes went out in the brighter dawn which lifted flaming cones upon the peaks of fair Glendowan." *

SAINT MARTIN'S DAY, NOVEMBER 11.

We come now to Saint Martin's day, a festival which for some reason seems to be connected with animal sacrifice throughout Christian Europe. Among the ancient Greeks this day was the beginning of the Vinalia or feast of Bacchus, which lasted four days and was a season of public carousing, being considered the time for trying the new wine, but there is no mention of sacrifices. In modern Europe also it is—or was—a time for testing the new wine and for feasting, drinking and public sports, but, in addition to this, we find among all the northern nations traces of sacrifice, which may have come down from the old Teutonic and Keltic religions. With the more practical moderns, this rite has generally degenerated into a simple provision of the winter's meat. On the continent, the animal commonly selected to die on this occasion is a goose, a preference for which the Norse assign a legendary reason. In England, the goose is killed on Saint Michael's day, September 29, while Saint Martin's day is considered about the proper time to kill beef and hogs for winter, whence it comes that a beef is called a marten in the north of England. In Gaelic Ireland, a beef cow is called a *márt* (*marth*). In England, it is said that on this night water is changed to wine, a belief transferred in Ireland to Twelfth-night, while in both countries it is held that on this day "No beam doth swinge, nor wheel go round."

Saint Martin, who has been styled the second apostle of France, came of a noble family in Pannonia, now included under the government of Hungary. By his father, he was designed for the military profession, but this life was distasteful to him, and he became a religious, being finally appointed bishop of Tours. He died, surrounded by his clerical companions, about the year 397. In the history of his life, even as related in Butler's "Lives of the Saints," a work which deals largely in the marvelous, we find nothing to account for the strange legends and practices

* Edgar L. Wakeman, Afoot in Ireland, in Washington (D. C.) *Evening Star*, Nov. 17, 1888.

connected with his name, and the conclusion seems irresistible that these belong properly to some earlier pagan god or hero.* Can it be that under the name of Saint Martin, the modern peasant is honoring Mars, the ancient god of war? The bloody rites which so distinguish this day from all others might well bear out such an assumption.

In Ireland, the poorer people sacrifice a goose or a rooster, while the wealthier farmers and graziers offer a sheep. When a rooster is to be the victim an effort is made to procure a black one, and in some districts it must be a *coilleach Mártaín* (*cölyakh Marthan*), or March cock, *i. e.*, one hatched in March from an egg laid in the same month. Strangely enough, a rooster is never sacrificed in some parts of Kerry, where the people dislike to kill one under any circumstances. The doomed animal is previously "named for Saint Martin," that is, dedicated for a sacrifice in his honor on Saint Martin's day, and the vow is sealed by "drawing blood" from it. In the case of a sheep, this is done by cutting a piece from its ear. A weakly sheep is sometimes thus consecrated, and so well tended in consequence that it may become the best in the flock, but no money would tempt the owner to sell it for any other purpose, altho there is no objection to selling the wool. The animal is killed on the day preceding the festival, and the flesh is eaten on Saint Martin's and succeeding days until consumed, a portion being also given to the poor in honor of the saint. The chief object in killing the animal is not to feast upon its flesh, but to "draw blood" for the saint, and it is believed that if any fail to draw blood for Saint Martin, he will draw blood from them.

In illustration of this belief, there is a story told in Connemara to the effect that a man once named a sheep for Saint Martin, but as the day approacht the animal was in such fine condition that his avaricious wife was constantly urging him to sell it instead. Afraid to break his vow, and equally unwilling to incur his wife's displeasure, he secretly killed a fowl and smeared the bed with the blood. Then getting into bed and covering himself up as if sick, he persuaded the woman that the saint was drawing blood from him in punishment of the contemplated impiety, until such fear seized her heart that she was as anxious as himself to see the sheep killed.

In Kerry, they tell a story of a man who had been always mindful to draw blood for Saint Martin, but who, for some reason, was at last banished from his native land. One night, in his new home, he was going along a road all alone when he suddenly remembered that it was Saint Martin's eve, and there came over him a feeling of deep regret that he could not be at home to draw blood on the occasion. At that moment a horseman rode up from behind and inquired where he was going. On being told, the stranger said that he was going the same way and invited the man to ride behind him on the horse. He consented, and mounted behind the

* It is, indeed, related that he once restored a woman's child to life, but the story as told seems hardly sufficient to give rise to the legends in connection with the drawing of blood on this day.

other. Soon the night grew so dark that he could not distinguish objects about him, until, at last, the stranger set him down at the end of his journey, and, sure, where did he find himself but at his own door at home in Ireland. "It was supposed from this," added the old man who told the story, "that the horseman was Saint Martin."

Like the other festivals, Saint Martin's day is considered to begin at midnight and to last until the following midnight. The blood must be drawn before the "day" begins—usually on the eve—as it is a common saying that the saint will take it before, but not after. A part of the blood is soaked up with tow or cotton and preserved for use in connection with certain prayers in the cure of various ailments.* In parts of Galway the blood is not preserved, but is sprinkled about the house and upon the people, and a bloody cross is marked upon the forehead of each member of the family. Those who are too poor even to afford a rooster sometimes gash one of their own fingers for this purpose.

The following detailed account of the practice as it exists to-day on the west coast, together with the reason assigned for the usage, is given by Lady Wilde, and applies equally well to other districts where the primitive customs are still kept alive :

"There is an old superstition still observed by the people, that blood must be spilt on St. Martin's day ; so a goose is killed, or a black cock, and the blood is sprinkled over the floor and on the threshold. And some of the flesh is given to the first beggar that comes by, in the name and in honor of St. Martin.

"In the Arran isles, St. Martin's day is observed with particular solemnity, and it was held necessary, from ancient times, to spill blood on the ground in honor of the saint. For this purpose a cock was sacrificed ; but if such could not be procured, people have been known to cut their finger in order to draw blood, and let it fall upon the earth. The custom arose in this way : St. Martin, having given away all his goods to the poor, was often in want of food, and one day he entered a widow's house and begged for something to eat. The widow was poor, and having no food in the house, she sacrificed her young child, boiled it, and set it before the saint for supper. Having eaten and taken his departure, the woman went over to the cradle to weep for her lost child ; when, lo ! there he was, lying whole and well, in a beautiful sleep, as if no evil had ever happened to him ; and to commemorate this miracle and from gratitude to the saint, a sacrifice of some living thing is made yearly in his honor. The blood is poured or sprinkled on the ground, and along the door-posts, and both within and without the threshold, and at the four corners of each room in the house.

"For this symbol of purification by blood the rich farmers sacrifice a sheep ; while the poorer people kill a black cock or a white hen, and

* See the author's "Medical Mythology of Ireland," in Proc. Am. Philos. Soc., xxiv, No. 125, p. 164, Philadelphia, 1887.

sprinkle the blood according to ancient usage. Afterwards the whole family dine upon the sacrificed victim. In some places it was the custom for the master of the house to draw a cross on the arm of each member of the family, and mark it out in blood."*

Another legend makes it his own son whom Saint Martin, like Abraham of old, was about to sacrifice out of love to God, because in his great poverty he had nothing else to offer him. Altho he loved the boy more than life, he kild him late one night, and then lay down, intending to complete the sacrifice at daybreak. On opening his eyes in the morning, he was surprised to see a sheep hanging up in front of him, all skind and drest. Full of wonder he went over to his son's bed, and there he found the boy sleeping quietly and in perfect health, with not even a mark to show where his father had driven the knife. The saint gratefully offerd up the sheep as a sacrifice to God in the place of his son, and thus the custom originated in remembrance of the miracle.

Saint Martin is stated to hav been a miller, and his festival is said to commemorate the day on which he was "drawn on the wheel," an expression which seems to hint at martyrdom and the rack, altho there is no authority for believing that he was either a miller or a martyr. In accordance with this tradition, it is held that no wheel should turn, or anything go round, on this day; no yarn may be spun, no mil may grind and no cart may be driven on the highway. Even a stocking should not be knitted, because in so doing it is necessary to turn it round upon the hand, and the boatman wil not put out from shore on this day, because in starting it is customary to turn the boat round on the water. So strong is this feeling that even in the city of Limerick the large factories sometimes find it difficult to procure a working force on the eleventh of November.

SAINT STEPHEN'S DAY, DECEMBER 26.

Christmas and New Year may properly be treated together, but Saint Stephen's day, the day after Christmas, deserves a separate notice, as it is one of the greatest of the Irish holidays, being always an occasion of mirth and merriment, in spite of bad crops and political agitation. The peculiar custom of carrying the wren (universally pronounced *wran*) on this or the preceding day seems to hav been common to the whole Keltic race, being found in Ireland, Man, Wales and France, altho, strangely enough, it is unknown in the extreme north of Ireland. In ancient Rhodes, the swallow was carried about by bands of children in early spring time, with singing of verses and demands for small gifts, very much in accordance with the modern Irish practice. Various stories ar current in Ireland to account for the cruelty shown the wren on this occasion, the reason commonly assignd being that the wren once gave the alarm to an army of invaders—according to one account, the followers of William of Orange, but by others said to hav been the Danes—by perching upon a drum head

* Lady Wilde, II, 131-2.

and thus waking a sleeping sentinel just as the Irish wer on the point of surrounding them. This very much resembles the old story of the sacred geese of Rome, but aside from the fact that the same tradition is related of other armies in other countries, being merely one factor in the universal folk-lore of Europe, the existence of the custom in France and Wales shows that it had its origin in some ancient Keltic festival prior to the introduction of Christianity. In the Isle of Man, the people defend the practice by saying that at this season the wren's body is animated by the spirit of a wicked fairy resembling the German Lorelei, and who can be kild at no other time.* Vallancey asserts that the custom originated in Ireland through the contrivance of the early Christian missionaries, who found the wren an object of superstitious regard amongst the people, and accordingly undertook to overcome this feeling by ordering that he should be hunted and kild on Christmas day, and his dead body carried about in triumph on the day following.† In Ireland and Germany, the wren is considered the king of birds, having won the kingship in a contest with the eagle, a story as old as the days of Aristotle and Pliny, as we ar reminded by the Latin name of *regulus* or "little king." In Breton legend, it is said to hav brought down fire from heaven, which would account for its sacred character among the Kelts.‡

For some days before Saint Stephen's, and especially on Christmas, troops of boys go about the hedges searching for wrens. The instant that one is perceivd, he is pursued by the whole crowd with stones and clubs, and it is generally but a few moments before his lifeless body is in the hands of his captors. It is believd in some parts that the wren is blind on this day, and therefore the more easily caught. Early in the morning of Saint Stephen's day, the various companies gather at their respectiv headquarters with bushes of holly or furz, which ar elevated on poles and decorated with the bodies of the slaughtered wrens, the more the better. A live bird is frequently tied by the legs to the top of the bush and is allowd to hang thus, with head down and wings vainly flapping, as the procession moves along. There is sometimes but one wren, which, in the south, is frequently carried in a frame consisting of two hoops, crossing each other at right angles, and fixt to the end of a long pole. Occasionally, dead wrens ar worn in the caps of the members of the party, some of whom wear masks as on Saint Bridget's eve. In Limerick and the adjacent districts of Clare, and sometimes also in Longford, and, perhaps, elsewhere, the wren is carried in a small coffin resting on a bier borne by four pall-bearers. In the Isle of Man also the wren is carried on a bier, and the whole ceremony is a whimsical travesty on a funeral.§ In Ireland, however, the proceedings ar by no means of a somber character. The crowd of boys and young men is generally accompanied by a piper

* Kelly, Folk-lore, 77.

† Vallancey, *Collectanea*, iv, Part 1, 97.

‡ Kelly, Folk-lore, 75.

§ Waldron, quoted in Brand, *Antiquities*, i, 472.

or fiddler, or at least by an expert trickster and tumbler, and in high good humor, and, carrying aloft the captured wrens, they go from house to house singing appropriate verses, and expecting in return a small gift of money, food or drink, on penalty of burying the wren in front of the door in case of refusal. This burial of the wren would doubtless be considered to bring bad luck to the members of the household, but, at all events, it would inevitably brand them as ungenerous, and this alone has such an effect upon the miserly ones that in all the author's inquiries he has heard of but one case in which the wren was actually buried in this manner. The money collected during the day is spent in a convenient tavern at night and a considerable portion is usually distributed among the poorer people. It should be stated that the "wren boys," as they are called, generally confine their visits to the houses of the wealthier farmers and gentry. When two parties of wren boys from different parishes come into collision there is frequently a contest for the possession of the wrens. In the city of Cork, where it is naturally somewhat difficult to procure birds, a dead mouse is sometimes made to do duty instead.

In Hall's "Ireland" it is incorrectly stated that the hunting of the wren is confined to the southern districts of Ireland,* but this is a mistake, for the custom is practiced in each of the four provinces. In Ulster, the northern province, it certainly exists in the counties of Cavan, Fermanagh and Tyrone, but seems to be unknown in Donegal, Antrim and the extreme north.

The songs sung by the wren boys vary greatly in character and meter, and many of them are doubtless improvised for the occasion. Like those sung on Saint Bridget's eve, a number are clearly of English origin. Some of them are mere nonsense rimes, but the first verse sung at each house is the same all over the country, the Gaelic form used in the west being nearly the equivalent of the English verse used in the eastern districts, and, as this verse refers more especially to the custom of the day, it is doubtless the original, to which the others have been tacked on later. The Gaelic version still used in Galway is as follows :

*Dreolín, dreolín, ríog na n-eun,
 Lá Steafáin a gab' an t-eun.
 Is beag é féin, is mór a m'úinín,
 Agus dá g'ab' sé capaire déanfáid' sé rince. †*

Which may be rendered literally :

Wren, wren, king of the birds,
 On Stephen's day the bird was caught.
 He is small himself, his family is great,
 And if he gets an oaten cake, he will make a dance.

* Hall, Ireland, I, 13.

† Pronounced : *Jroelyeen, jroelyeen, re na n'yaen,
 Lw Schifawn a goiv an chaen.
 Is byug ae haen, iss moer a winchir,
 Ógus dhaw ghaw'shae cápara yena shae rínca.*

The following is the corresponding verse used in the English-speaking districts :

The wran, the wran, the king of all birds,
 Saint Stephens'es day he was caught in the furz.
 Altho he's but small, his family's great ;
 Rise up, landlady, and giv him a *thrate*.

Among the verses added in different parts of the country ar the following, the names being changed according to the house visited :

1. Mister O'Brien is a worthy man,
 And to his house we brought the wran—
 We brought the wran to visit you here,
 Wishing you a happy Christmas and many New Years (*sic*).—CORK.
2. The wran was so cute and I was so cunning,
 He stood in the bush while I was a-running.
 On Christmas day in turning a splt,
 I burnt my finger and I feel it yet.
 Between my finger and my thumb
 There lies a blister as big as a plum.—CORK.
3. My shoes ar wore, my coat I tore,
 I followd the wran three days or more.—MEATH.
4. The wran is dry and so am I,
 Giv us something or we'l let him fly.
 From bush to bush, from tree to tree,
 They hunted the wran along with me ;
 Then up with the kettle and down with the pan,
 And giv us a drink and let us be *gan*.—LIMERICK.
5. Come huntin' the wren, says Robin to Bobbin ;
 Come huntin' the wren, says Richard to Robin ;
 Come huntin' the wren, says Jack Tilaone ;
 Come huntin' the wren, says every one !*
6. We hunted the wren through frost and snow ;
 We hunted the wren seven miles or more ;
 We knocked him down and he could not see ;
 And we brought him home in a holly tree.*
7. *T'ugus t'u mo d'reolin liom air saot'ar,*
Agus air a g-Cnoc Ard-d'roig'eanae' b'i se air b'ile.
'Nuair-a b'i se d'a t'úirt agus a t-anam da creat'ad'
D'iarr se a t'ab'airt go dtí Mister Read'mond.
Air M'ister Read'mond é f'ein a f'uascailt,
Beoir 'gus coifé go fairsing da e'om'lu'c'd.†—KERRY.

* Probably used in Galway or some other part of the west. From Edgar L. Wakeman, Afoot in Ireland, in Washington (D. C.) *Evening Star*, Dec. 22, 1888.

† Pronounced: *Huggas hu ma ghroctyeen loom er sathar,*
Ógus er a gnuc ardh-reenakh ve shae er bacla.
Nur-a ve shae ghaw hoorch ógus a thunnam dhaw khræha,
Jeer shae a hoorch go jee M'ister Raymond.
Er V'ister Raymond ae haen a wuasculch,
B'yoer 'gus coffe go fursing dhaw khoalakhdh.

This, which is not strictly grammatic, may be rendered :

I hav brought to you my panting wren ;
 And on the high blackthorn hil* he was at his meal.
 When he was exhausted and his soul a-trembling,
 He begd to be taken to Mr. Raymond.
 From Mr. Raymond, to release himself,
 Beer and coffee in abundance (to demand) for his companions.

8. As down the glen, boys, we did *bate*,
 Our gentleman to overtake,
 We overtook him in the glen,
 Which caused our wran boys for to sing—
 Sing holly, sing ivy—sing ivy, sing holly,
 Christmas day it is all but a folly,
 But Christmas comes but once a year,
 And when it comes, it brings good cheer.—CORK.
9. The wran, the wran, the king of all birds,
 Saint Stephens'es day, he was caught in the furz.
 I broke all my toes a-gathering the sand,
 Pray, madam, do giv me a drop of the dram.—CAVAN.
10. Here comes I, says Beelzebub,
 And over my shoulder I carry a club,
 And in my hand a dripping pan,
 I call myself a jolly old man.—CAVAN.
11. Sing holly, sing ivy—sing ivy, sing holly,
 A drop just to drink, it would drown melancholy,
 And if you fill it of the best,
 I hope in heaven your soul may rest ;
 But if you draw it of the small,
 It won't agree with my boys at all.—KERRY.

Nos. 4 and 11, like the verses already given under Saint Bridget's eve, are evidently derived in part from some old English verses sung on Saint Catherine's day, November 25, by children going from house to house like the Irish wren boys. Among those quoted by Brand as the following :

Up with your kettle and down with your pan,
 Give us an answer and let us be gone.

* * * * *

Roll, roll,
 Gentle butler, fill the bowl ;
 If you fill it of the best,
 God will send your soul to rest ;
 But if you fill it of the small,
 The devil take butler, bowl and all.†

No. 10 is probably derived from an old Christmas drama of Cornwall,

* *Choc Ard-d'roig'eanac*, "the high blackthorn hil," overlooks the town of Tralee in Kerry.

† Brand, *Antiquities*, i, 413-4.

described by a writer in the *Gentleman's Magazine*, in which one of the characters, known as Rub-a-bub, enters, saying :

Here comes I, Old Rub, Bub, Bub, Bub ;
 Upon my shoulders I carries a club,
 And in my hand a frying pan,
 So am I not a valiant man ? *

THE CHRISTMAS HOLIDAYS, NEW YEAR AND TWELFTH-NIGHT.

The Christmas holidays ar supposed to include the whole season from Christmas eve to Twelfth-night, and may properly be treated together, with the exception of Saint Stephen's day, which has already been noticed. The holiday season therefore lasts nearly two weeks, the principal days being Christmas, December 25 ; New Year, January 1 ; and Twelfth-night, January 6. In England and in some countries on the continent, the season was formerly considered to begin at Hallow e'en and extended to Candlemas, February 2, thus embracing a period of three months.

With regard to the origin of these winter holidays, it may be stated that, like nearly every other festival in the modern calendar, they ar simply heathen festivals which the church, being unable to suppress, found it necessary to tolerate and finally to invest with a Christian significance. This festival season was common to all the prominent nations of antiquity, even as far as Persia. In Rome the period was devoted to the Saturnalia, Sigillaria and Compitalia, the first of which lasted several days, and was celebrated in honor of Saturn, the god of agriculture. The feasting and gayety, the evergreen decorations, the fantastic processions of the mummers, and the custom of giving and receiving presents at this season, hav all come down to us unchanged from the ancient pagan festival of two thousand years ago. The Compitalia or plowman's feast, which closed the festivities in pre-Christian Rome, stil survives in the Plow Monday of England, following immediately after Twelfth-night. The custom of secretly putting presents into stockings belongs properly to the feast of Saint Nicholas (Santa Claus), December 6, and is supposed to be typical of that saint's practice of secret almsgiving. The transfer of the custom from the lesser to the greater holiday was natural and easy. In Ireland, as in other countries of Europe, the children hang up their stockings on Christmas eve to receiv the gifts which they ar told Santa Claus puts into them during the night, climbing down the chimney for the purpose. The Christmas tree is not a feature of the Irish observance. Presents ar also exchanged among the older ones, and on meeting at the chapel in the morning each seeks to make the first claim upon his neighbor by shouting, " My Christmas box on you !" at the same time wishing the customary " Merry Christmas and happy New Year." Presents ar also made on New Year, altho not to the same extent.

The ancient Germans and Scandinavians had, at this season, a festival

* W. S. (1811), in *Pop. Sup.*, 82.

call'd Yule, which was with them one of the principal occasions of the year. Fire seems to hav playd an important part in the Yule celebration, and Grimm is of the opinion that the Yule fire of the Germans was the equivalent of the Samhan fire of the Keltic nations.* The "Christmas log" and "Christmas candle," which ar kept burning from Christmas to Twelfth-night, ar common to Ireland, England and Scotland, the former being found also in France and among the Letts.† Speaking in this connection, Brand says : "I am pretty confident that the Yule block will be found, in its first use, to have been only a counterpart of the midsummer fires, made within doors because of the cold weather at this winter solstice, as those in the hot season, at the summer one, are kindled in the open air."‡

At this season of the year the druids of Gaul wer accustomed to repair to the woods to gather the mistletoe with much ceremony, but how far this practice was observd by their Irish brethren is not clear, altho the mistletoe was a sacred plant with ancient Kelts and Germans alike, being regarded as a great panacea and a promoter of fertility in cattle.

The Gaelic name of Christmas is *Nodlog* (*Nullog*),§ and it is considered at once the most joyous and the most solemn festival of the whole year. Everybody is up long before daylight, and it would be regarded as the greatest of misfortunes to be unable to attend early mass in the morning. Even the poorest strive to hav something better than common for the Christmas dinner, and this feeling is embodied in the Kerry proverb :

Christmas day and the day of the turf,
Them ar the days we'l eat enough,

alluding to the day on which the turf is cut, on which occasion the farmers hire a number of the poverty-stricken laborers to assist them, and always make it a point to give them a good dinner for once. As the general festivities, the giving of presents and hanging up of stockings by the little ones, hav already been noticed, we shal proceed to describe those features which savor more of a national character.

The mummers, as they ar call'd, go about here as they do in England and on the continent, from Christmas to Twelfth-night. In appearance and manner they resemble the May boys already described in treating of May-day. Drest in fantastic style and singing verses suited to the occasion, they visit the houses of the farmers and gentry, and go through a whimsical dance or rude dramatic performance, with the aid of a piper and a "fool," the latter being frequently envelopt in the skin of a cow. Sometimes a sham battle is enacted by mounted warriors armed with wooden swords. In return for their efforts to amuse the people, they

* Grimm, *Mythologie*, I, 581 and 593.

† *Ibid.*, 501.

‡ Brand, *Antiquities*, I, 471.

§ Evidently the same as the French Noel, and perhaps, also, the German Yule.

expect a small reward at each house, and in this they are seldom disappointed.

In the *Gentleman's Magazine* for 1824 we find an interesting description of a company of mummers, who had ventured to cross over to the vicinity of Dublin from their native parish on the other side of the bay. They seem to have created as much alarm among the ruling powers as an army with banners, and the account furnishes an apt illustration of the combination of police surveillance and ponderous magisterial acumen that has so long prevailed in the Green Isle.

"They consisted of fifteen young men grotesquely attired in ribands, white shirts outside their clothes, papers and rosettes in their hats, and large sashes round their waists, and one was dressed in woman's clothes; two of them carried swords of a very ancient appearance; the remainder had sticks. Being noticed by the police landing from a boat, Peace-officer Sharpley proceeded to interrogate them; and considering it necessary to prevent such a formidable body from perambulating the district, immediately despatched a messenger to Mr. Goodison of the College Street office, who directed Peace-officer Campain and his party to proceed to Williamstown, when they took the whole number into custody as suspicious characters going through the country disguised. They were brought before Mr. Alderman Fleming and Sir Garret Neville, when one of them, Michael Darley, who stated himself to be the king of the party, said, that they came from Raheny, and that they had been out on the Christmas gambols since St. Stephen's day; that hearing there were a number of gentlemen's seats at the side of the water, he and his subjects undertook a voyage across the bay, to visit the shore of Williamstown and its vicinity. On being asked by Sir Garrett Neville where they got the swords, he said they got one from a man of the name of Neill, gardener to Mr. Joy, and the other from a person at Raheny, and that their intentions were entirely harmless; they assembled for the purpose of getting Christmas boxes, according to an ancient custom (in his dominions) at the other side of the water; and that the king and Hector (one of his guards) were always armed with swords. To a question by the magistrates, he said he was an historian, and his fool was treasurer, and carried a bladder fixed to a long pole; the party spent whatever they got in drinking, dancing and other amusements. They got money from Dean Ponsonby, Dean Gore, and many other gentlemen. 'His majesty' referred to Counsellor Casey for a character. The magistrates, after a severe admonition, had them detained for further examination." *

In Connemara the people "draw blood" on Christmas as on Saint Martin's day. The animal is killed the day before, but is not previously "named" as is the case when dedicated to the saint. So deeply rooted is this custom that poor people eagerly buy from the farmers old sheep which are almost worthless, in order to kill them for this occasion, and

* Writer in Pop. Sup., 96, 97.

those who ar without money wil bind themselvs to do a certain amount of work in return for such an animal. While this eagerness is due in great part to the natural desire to hav a good dinner on Christmas at least, it may point also to sacrificial rites in connection with the old druidic celebration of the winter festival.

Every family that can possibly do so procures a large log known as the *bloc na Nodlog* (*bluc na Nullog*) or "Christmas block," to burn in the hearth-fire upon this day. The log is usually from the trunk of the resinous bog deal, now found only below the surface of the bogs. It is procured some time in advance, so as to be thoroughly dry for the occasion, and is sometimes kept burning at intervals until Twelfth-night. As previously stated, this custom, with that of the Christmas candle, is found also in other countries, and is evidently a survival of an ancient fire celebration.

The Christmas candle, which is usually kept lighted at intervals from Christmas to Twelfth-night, varies considerably in the different districts. In Connemara it is calld *truislán* (*thrushlawn*) and is made of twelv rushes plaited together and wrapt around with thread to prevent their untwisting in burning, the whole being dipt in melted tallow so as to form a large candle a yard or more in length. This is fixt upright on the table at supper on Christmas night (eve?) and allowd to burn for about an hour, when it is extinguisht, to be relighted in the same way on New Year's night and Twelfth-night. What remains is then put carefully away and preservd as a talisman to bring good luck to the house.

In many parts of the country the Christmas candles ar now supplied by the stores. They ar made of large size and variously colord, and in Kerry ar lighted on Christmas night and each night thereafter until Twelfth-night, inclusiv. On Twelfth-night they hav what is known as the *coineal trí lad'rac* (*cunyoel chre liarakh*) or "three-prongd candle," made by dividing the wick of an ordinary candle into three parts, which ar then dipt into melted tallow, so as to form three smaller candles above the large one. These ar all lighted simultaneously and gradually burn down to the main one, which continues to burn until extinguisht. A similar candle is described in Hall's "Ireland" as being burnd in Cork on Christmas eve until midnight, after which what remains is preservd as a safeguard against evil spirits.* It was probably originally used in the south, as in Connemara, during the whole period of the Christmas holidays.

On Twelfth-night, in Roscommon and the adjacent parts of Galway, rushes ar cut into pieces about six inches in length, which ar peeld from top to bottom, leaving only a thin strip of skln to prevent their breaking. These ar then dipt into melted lard or tallow and arranged in a circle around the edge of a cake of cow-dung, after which each member of the family selects one to represent himself. They ar then lighted, and it is believd that the lives of those present wil be long in proportion to the time occupied by the rushes in burning, he whose light goes out first be-

* Hall, Ireland, I, 26.

ing doomed to die soonest, and so on with the others. If there be more than twelve persons in the household, there are an equal number of the rush candles, but there are always at least twelve rushes. Piers describes a similar custom on this night as existing in Westmeath as far back as 1682, when a sieve of oats was set up in an elevated position and a lighted candle placed in the centre, surrounded by twelve smaller ones around the edge.* The twelve small candles surrounding a larger one, and the twelve rushes used in the same way in the west, had probably an astronomic significance in connection with the ancient pagan fire festival, although they are now explained to be typical of Christ and His Apostles.

In the eastern districts there is a proverb that "a green Christmas makes a fat graveyard," as warm weather at this time of the year is believed to be unhealthy. Christmas night is not regarded as particularly sacred, but Christmas eve is held in high veneration, and no danger can come to any one walking out at that time, as no evil spirit has then the power to harm. On Twelfth-night, on the contrary, as on Saint John's eye and November eve, it is considered unsafe to be out after dark. According to Lady Wilde,† the ass is said to kneel down in adoration of Christ on Christmas morning, and if one can manage to touch the cross on the animal's back at that moment, any wish of his heart will be granted.

January 1, in the church calendar, is the feast of the circumcision, but its popular name of New Year points to a more remote origin in the pagan festival of Janus, the god of the year, represented on old sculptures as having two faces, one looking back over the year that is gone, the other looking forward to the new one coming on. No particular observances are connected with the day beyond going to church and giving and receiving presents as on Christmas, the latter custom having come down from the ancient celebration. Strangely enough, the practice of giving presents was forbidden by the early church, but the popular custom proved too strong to be broken down.

As might naturally be expected in connection with the first day of the year, several interesting beliefs are held in regard to New Year. He who gets up before sunrise on this morning will not be lazy for one year—a statement which we can easily believe without any great stretch of the imagination. It is unlucky to pay out money, or to lend or give anything—particularly fire—out of the house on this day, regular presents only excepted, as this would be to give away the year's prosperity. This was also an ancient Roman belief in connection with the feast of Janus. In several districts, both north and south, it is customary to throw a pancake against the door to keep out hunger during the coming year, but this practice seems to be unknown in Galway.

If a woman be the first to enter the house on New Year, bad luck will come to the inmates. In order to guard against such a misfortune two

* Piers, Westmeath, 124.

† Lady Wilde, II, 107.

neighboring families sometimes arrange to hav a man from each house visit the other the first thing in the morning, and one man was said to get over the difficulty by making it a point to get up himself before daybreak and go through the door and back again. A similar belief exists in England.

In Galway and probably in other parts of the country, it is customary on New Year eve to put a stick into a stream or pool with a notch cut to indicate the hight of the water. If the water be above the mark in the morning—*i. e.*, should any rain fall during the night—provisions will be high during the coming year. If the water be found to be below the notch, provisions will be correspondingly low. As the Gaelic proverb has it, *Má éirig'eann an tuile, éirig'eann an buiseul, 'smá ísliig'eann an tuile, tuituig'eann an buiseul*,* “If the flood rises the bushel rises, and if the flood lowers the bushel falls.” The same custom is practiced in Germany to determin whether the year wil be wet or dry.

Twelfth-night, January 6, is so calld on account of its being the twelfth night after Christmas. It is also known as Little Christmas or Old Christmas, by reason of its being the date formerly fixt for Christmas before the adoption of the Gregorian calendar in 1752. Stil another name, used more especially in the south, is “Night of the Three Kings,” as it is believd to hav been on this night that the magi from the East visited the infant Savior. In commemoration of this event the triple candle is lighted in Kerry, as already described, and it was formerly the custom also to bake a three-cornerd loaf or cake of bread on this day for the same reason, just as it is customary in England to bake a pie in the shape of a cradle and a cake in form like an infant on Christmas day.

On this night the cattle all kneel down and worship with their faces toward the east. In Kerry, it is said to hav been on Twelfth-night that Christ turnd water into wine at the marriage feast of Cana, and at a certain hour on this night every running stream is changed into wine. But no one must venture out to watch for the miracle, for two girls once went out to see the wonder and wer never heard of afterward. In Connemara, the change is believd to take place on New Year eve, and it is customary to begin the day by drinking a glass of water in honor of the event. In England, a similar miracle is said to occur on Saint Martin's night, November 11, the anniversary of the ancient feast of Bacchus, god of wine, a fact which is probably at the bottom of the modern belief.

The mummers go about with their songs and dances from Christmas until Twelfth-night, when the holidays come to an end. The national game of *camán*, or hurling, also holds a prominent place in the holiday sports in all parts of the country. The whole period is deemd sacred and no work that can possibly be postponed is done while it lasts. Each of the twelv days during this period is held to foreshadow the weather for the

* Pronounced: *Maw írean an thuilya, írean an búshael, smaw eeshleeen an thuilya, thieheen an búshael.*

corresponding one of the twelve months of the coming year. Thus, should a snow storm occur on the day after Christmas, January will be a month of snow; and if the day before New Year be mild and agreeable, so will be the coming month of June. Now also might one bid farewell to the cares of the world without regret, for all who die during this blessed season go straight to paradise.

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*On the Inclinations of the Asteroids.**By Professor Daniel Kirkwood, Bloomington, Ind.**(Read before the American Philosophical Society, May 17, 1889.)*

The forty-ninth page of my little volume on the Asteroids contains a brief statement respecting the orbital positions of these bodies, and the supposed connection between great eccentricity and high inclination. If the phenomena referred to have any bearing on the theory of asteroid formation—in other words, if facts hitherto regarded as isolated prove mutually dependent, may not their discussion point out new and unexpected relations? A more exact examination, at least, of these planetary statistics will not be without interest.

The first column of the following table gives the asteroids in groups of ten, in the order of distances; the second, the limits of the respective groups; and the third, the average inclination of the several clusters.

INCLINATIONS OF THE MINOR PLANETS.

Groups.	Distances.	Av. Inclinations of Groups.		
1 to 10	2.13 — 2.28	30	37'	32.8''
11 — 20	2.28 — 2.36	7	0	22.1
21 — 30	2.36 — 2.38	11	0	13.9
31 — 40	2.38 — 2.40	12	20	15.2
41 — 50	2.40 — 2.43	6	44	48.1
51 — 60	2.43 — 2.45	5	25	7.4
61 — 70	2.45 — 2.56	7	20	51.5
71 — 80	2.56 — 2.58	10	19	23.2
81 — 90	2.58 — 2.616	9	27	49.3
91 — 100	2.616 — 2.647	8	10	43.1
101 — 110	2.647 — 2.667	7	2	53.5
111 — 120	2.667 — 2.685	8	4	11.0
121 — 130	2.685 — 2.712	9	25	17.1
131 — 140	2.712 — 2.737	8	2	6.1
141 — 150	2.737 — 2.745	10	10	30.0
151 — 160	2.745 — 2.762	8	36	12.7
161 — 170	2.762 — 2.771	11	23	0.2
171 — 180	2.771 — 2.799	10	36	6.2
181 — 190	2.799 — 2.870	8	16	7.1
191 — 200	2.870 — 2.921	8	10	4.8
201 — 210	2.921 — 3.012	7	23	35.3
211 — 220	3.012 — 3.06	7	48	19.0
221 — 230	3.06 — 3.11	5	54	43.0
231 — 240	3.11 — 3.126	8	48	52.6
241 — 250	3.126 — 3.14	7	0	36.9
251 — 260	3.14 — 3.185	10	46	51.3
261 — 270	3.185 — 3.42	8	39	16.8
271 — 280	3.42 — 4.24	6	28	26.3

REMARKS.

1. The average inclination of the first hundred (in the order of distance) is..... 8^o 8' 42.66''
 Of the second hundred..... 8 58 38.87
 Of the last eighty..... 7 51 20.15
 And that of the whole two hundred and eighty. 8 21 34.87
2. The inclinations in the edges of the ring are less than the average.
3. Other *minima* are found about the distances 2.44 and 3.09. The *maximum* between 2.36 and 2.40 is distinctly marked.
4. As in the case of other planets, the inclinations vary, though with extreme slowness. It has not been shown, however, that the *average* will change to any great extent.
5. This average compares thus with certain other inclinations :
 Mercury's orbit 7^o 00'
 Plane of the Sun's equator..... 7 15
 Average inclination of asteroidal comets..... 16 40
6. The *maximum* inclinations of Mercury and Mars are 10^o 36' and 7^o 28' * respectively. The table indicates that *the mean inclination* of the asteroids has not differed greatly from the mean inclination of Mercury.

A Review of the North American Species of Hippotherium.

By E. D. Cope.

(Read before the American Philosophical Society, May 3, 1889.)

The relation of this genus to the other genera of Perissodactyla was indicated by Kowalewsky in his work on the genus Anthracotherium, published in the "Palæontographica" for 1874. He there showed that the genus occupies a place between Anchitherium and Equus in the genealogical phylum, as it does in geological time. In a paper on the "Systematic Arrangement of the Perissodactyla,"† the present writer placed Hippotherium in the family Palæotheriidae, in a subfamily Hippotheriinae, which was defined as follows: "Bicipital groove of humerus double; molars with cement in the valleys." This subfamily embraces the genera Hippotherium Kaup, and Protohippus Leidy. The Palæotheriidae is here only distinguished as a whole from the Equidae by the presence of perfect second and fifth digits.

The place of Hippotherium in the line of ancestry of the genus Equus

* Stockwell's Mem. on the Sec. Var. of the El. of the Eight Princ. Planets, Smith. Contrib. to Knowl., 232, p. 116.

† Proceedings American Philos. Soc., 1881, p. 399.

has been admitted by Kowalewsky, Huxley, Marsh and the writer. I have pointed out* that it is probable that the ancestry of some of the species of *Equus* can be traced to *Hippidium*, and therefore to *Protohippus*, as well as to *Hippotherium*, thus showing a diphyletic ancestry of the true horses. Mlle. Marie Pavlov† has devoted some care to the attempt to demonstrate that the latter genus could not have entered into this line. Her objections are derived from a consideration of the characters of the feet. Until however we know the structure of the feet in species of *Hippotherium* other than the *H. primigenium* of Europe, we cannot be positive as to the relation of particular species of that genus to particular species of *Equus*.

HIPPOTHERIUM Kaup.

Jahrbuch für Mineralogie, etc., 1833, 327 (description). *Nova Acta Leop.* 1835, xviii, 171-182. Jahrbuch f. Mineralogie, 1835, 622. *Bronn Lethæa Geognostica*, 1853-6, iii, p. 876.

Hipparion Christol. "Annales science d. Midi, 1832, March, May," name only, fide Bronn. "These sur les Brèches Osseuses, 1834, 26; Annales des Sciences Naturelles, 1835 b, v, 193," name only, fide Bronn.

Anterior interior column (protocone) of the superior molars distinct from the anterior interior crescent, hence giving an isolated dentinal area on attrition. Second and fifth digits present on both limbs, and of reduced size. Bicipital groove of humerus double. Metapodials without trochlear keel on the anterior face; third metatarsal without entocuneiform facet.

The preceding characters define a genus which had a general distribution over the Northern hemisphere during late Miocene and Pliocene time. It embraces a number of species, which were evidently present in droves in the countries where their remains are now found.

This genus and *Protohippus* include the latest representatives of the three toed horses, the lateral digits being reduced to small proportions. These genera represent also two types of dentition easily modifiable into *Equus* by slight alterations in the relations of the internal columns of the superior molars. In *Hippotherium* the coalescence of the internal columns has not been accomplished, for one of them remains in the isolated position of the internal cone of the symphodont type of dentition. In the species of the *H. occidentale* type, the anterior column is larger than the posterior, displaying considerable increase in the anteroposterior diameter. This is the character of the same column in *Equus*, and the junction of the column with the adjacent crescent is all that is necessary to convert the one genus into the other, so far as the superior molars are con-

* *American Naturalist*, 1887, p. 1075.

† *Etudes sur l'Histoire Paléontologique des Ongulés; II. Le Développement des Equidæ*, Moscow, 1884.

cerned. In *Protohippus*, on the other hand, the junction has already taken place, but as the columns are of equal size, the pattern resulting is different from that of *Equus*. It is that of *Hippidium*, which, like *Equus*, has but one digit. An approach to *Hippidium* is seen in the species of Group II of the analytical table below, to one of which I gave the name of *Stylonus*. In this type the internal columns are of subequal proportions as in that genus. The posterior is joined to the corresponding internal crescent, and though the anterior column approaches very near to the anterior internal crescent by an apex of its section, it never does actually join. On the other hand, the posterior column is distinct in the just-protruded molar, and in the *H. seversum* remains distinct for a considerable part of the age of the animal.

The genus *Hippodactylus** Cope, has the molar teeth of the general character of *Hippotherium*, but it possesses, like *Hippidium*, but one digit. The type is the *H. antelopinum* Falconer, of the Sivalik Upper Miocene of India. I think it not unlikely that when the skeletons of some of the species here referred to *Hippotherium* come to be known, that some of them will be found to belong to *Hippodactylus*.

History.—This genus was named by Christol and Kaup within about a year of each other, according to Bronn. I have not been able to refer to the essay in which the earliest name, that of Christol, was published, but according to Bronn, it was not accompanied by any generic description. In Kaup's first publication an attempt is made to characterize the genus, and although the description contains some errors, the important fact of its possessing dew-claws is mentioned. Two years later Kaup published a fuller and more accurate diagnosis. Christol does not appear to have ever given a description of the genus. The use of his name (*Hipparion*) does not therefore appear to be warranted.

Species.—The type is *Hippotherium primigenium*, the *Equus primigenius* of Von Meyer and the later *H. gracile* of Kaup. Its remains are common in the Mediterranean countries of Europe, and in France. A few other species have been discovered in the Old World. Their history has been elucidated by Wagner, Duvernoy, Gervais and others. North America has furnished a larger number of specific forms than any other country.

The American species of *Hippotherium* differ in the extent of the pre-orbital facial depression. In *H. speciosum* as in *H. primigenium*, the fossa is confined to the superior part of the facial region; in *H. isoneurum* it extends downwards to the molar ridge, as in certain species of *Protohippus*.

The teeth of this genus are most frequently found in a well-preserved condition, and are hence most useful for purposes of determination. The species may be ascertained from those of the maxillary bone, though not without some difficulty. This is rather due to differences between the teeth of the same series than to the variability of the characters them-

* American Naturalist, 1888, p. 449.

selves. In the species successive modifications may be traced from the equine form of the genus represented by *H. occidentale* to that which approximates the genus *Protohippus*, represented by *H. seversum*. In the former the anterior interior column is larger than the posterior, forms a more prominent rib on the inner face of the crown of the tooth, and is flattened or even concave on the inner side. After this form come others where the anterior column is round, and then others where it presents a ridge towards the anterior inner crescent, which in the worn section forms an apex or angle of the outline. The succeeding forms have the two inner columns of equal diameter and prominence, and though the anterior one maintains its distinctness its section projects in an angle towards the adjacent crescent. Finally we have the form where the subequal columns are both separated from their adjacent crescents, forming the supposed genus *Stylonus* Cope.

The internal columns in all the species become most longitudinally compressed in the posterior superior molars. The enamel borders of the lakes are frequently less complex in these teeth. In all the molars the apices of the crescents and columns are narrower in earlier than in later stages of wear, and the posterior inner column is sometimes separate for a short time. The enamel borders of the lakes become more complex also on wear, till middle age; they then, on further wear, become more simple.

In the following analytical table the characters of the fifteen species known to me from North American formations are set forth:

I. Anterior internal column of superior molars more prominent inwards than the posterior, larger, and not approaching union with the anterior internal crescent. *Hippotherium* Kaup.

A. Section of anterior internal column concave or flat on the internal side. Crowns prismatic.

a. Lake borders very complex; the loop nearly or quite isolated.

Grinding surface subquadrate; crown straight; larger; crown 25 mm.

long; 24 mm. wide.....*H. occidentale*.

Like the last; smaller; grinding face 22 by 21 mm.....*H. montezuma*.

Grinding surface oblong, 19 by 16 mm.; crown curved.. *H. peninsulatum*.

aa. Lake borders simple; loop simple, open.

Grinding surface oblong, 22 by 19 mm.; crown nearly straight

H. sinclairii.

AA. Section of anterior internal column oval.

a. Internal columns wide apart.

Grinding face subquadrate, 20 by 19 mm.; lakes of medium complexity.....*H. speciosum*.

Like the last, but lake borders highly complex.....*H. plicatile*.

Grinding face oblong, 22 by 21 mm.; lakes of medium complexity; column apiculate as in sect. *Stylonus*; p. m. ili elongate.. *H. sphenodus*.

Grinding face oblong, smaller, 19 by 17 mm.; lakes of medium complexity; column entire.....*H. gratum*.

aa. Anterior internal column joining the posterior internal column.

Grinding face oblong, 20 by 17 mm. ; lakes rather complex, with a large loop.....*H. retrusum*.

AAA. Section of anterior internal column round.

Larger ; grinding face square, 19 by 20 mm. ; complexity medium ; posterior column not so prominent inwards.....*H. paniense*.

Smaller ; grinding face longitudinal, 19 by 17 mm. ; lakes complex ; posterior internal column not prominent.....*H. venustum*.

Smaller ; grinding face transverse, 16 by 19 mm. ; posterior inner column nearly as prominent as anterior inner.....*H. relictum*.

II. Posterior internal column as prominent inwards and of nearly equal size with the anterior, and nearly cut off from the posterior inner crescent. Anterior inner column with an apex directed towards the anterior inner crescent. *Stylonus* Cope.

Large ; grinding face 24 by 23 mm. ; largest premolar short, wide

H. calamarium.

Smaller ; grinding face 20 by 18 mm. ; largest premolar elongate, wedge-shaped.....*H. isonesum*.

Smallest ; grinding face 17 by 17 mm. ; lake borders simple.. *H. seversum*.

The stratigraphic position of these species is as follows :

Lower Pliocene.

H. relictum Cope.

? *H. venustum* Leidy.

Ticholeptus bed.

H. seversum Cope.

H. isonesum Cope.

Loup Fork (Upper Miocene).

H. calamarium Cope.

H. paniense Cope.

H. retrusum Cope.

H. gratum Leidy.

H. sphenodus Cope.

H. plicatile Leidy (? horizon).

H. speciosum Leidy.

H. sinclairii Wortman (? horizon).

H. peninsulatum Cope.

H. montezumæ Leidy.

H. occidentale Leidy.

Of the preceding fourteen species I have seen teeth of all but the *H. venustum* of Leidy, which was found in the South Carolina phosphate beds. I e parts of several individuals of the *H. gratum* from Kansas, and the *H. retrusum* is from the same locality. *H. plicatile* is from Florida, and the *H. peninsulatum* and *H. montezumæ* are from Eastern Mexico. I have

but one molar each of *H. occidentale* and *H. sinclairii*, both from Cottonwood creek, Oregon. *H. speciosum* is the most abundant and widely distributed species; Leidy reporting it from Dakota, Nebraska and Texas, and its occurrence in New Mexico being recorded in my report to Lieut. Wheeler. Mr. Hill has since obtained fine specimens in Kansas. The *H. paniense* is known from a few teeth obtained by myself in Northeastern Colorado. The *H. calamarium* I found to be the predominating species in the Loup Fork beds near Santa Fé, New Mexico, and it is not rare in Northeastern Colorado. *H. isonezum* was apparently common in the Northwest, two fine specimens having been found by Mr. Wortman on the Cottonwood creek, Oregon, and one or more on the Deep river, Montana, by Mr. J. C. Isaac. *H. seversum* is so far only known from an Oregon specimen. The *H. relictum* has been so far also only found in Oregon.

HIPPOTHERIUM OCCIDENTALE Leidy.

Proceed. Academy Philada., 1858, 27. *Hipparion occidentale* Leidy, Proceed. Academy Phila., 1856, 59. Extinct Mammalia Dakota Nebraska, 1869, 281, 326, Pl. xviii, Figs. 1-5; xxvii, Fig. 2.

Known to me from a single superior molar tooth of the left side, found by Mr. Wortman on Cottonwood creek in Eastern Oregon.

The crown is very long, and almost rootless, and the cement layer is quite thick, especially towards the distal portion of the crown. The inner anterior column is flattened, and occupies a middle part of the fore and aft diameter of the crown. It is slightly crescentoid in section, and presents its anterior apex slightly inwards. The posterior inner lobe is not cut off from the inner crescent by any contraction. The lakes have their inner portions very prominent and marked off from the external portion by deep inflections of the border. There are two posterior and two interior inflections of the anterior crescent, and the adjacent ones of the two pairs nearly cut off a large loop, which thus occupies the centre of the crown. The posterior lake has two anterior and no interior inflections.

Measurements.

	M.
Length of crown.....	.056
Diameters of crown {	
anteroposterior.....	.034
transverse.....	.024

I suspect that the *Hippotherium affne* Leidy (Extinct Mammalia, Dakota and Nebraska, p. 286) is based on young individuals or represents a slight variety of this species.

HIPPOTHERIUM SINCLAIRII Wortman.

Revue Scientifique, Paris, 1883, p. 712.

I know a single left superior molar of this species. It is easily distinguished from the corresponding tooth of *H. occidentale* by its inferior size

and relatively smaller transverse diameter. Its dimensions are about those of the *H. speciosum*, but it differs from that species in the larger and flatter inner column, longer crown, and less complex folds of the borders of the lakes.

The crown is long and nearly straight, as in *H. occidentale*. In its present condition there is but little external cementum, which may be a result of weathering, nevertheless that which remains in the grooves of the inner side does not form a thick layer. The outlines of the lakes are not extended inwards as in *H. occidentale*, and the transverse diameter of the latter is relatively small. The anterior lake has one posterior inflection, one interior and one anterior; of the posterior lake there are two anterior, none interior and one posterior; a short loop extends towards the inner column area. The latter is convex on the outer side, and without trace of angle or apex.

Measurements.

	M.
Length of crown.....	.043
Diameters of crown	{
anteroposterior.....	.021
transverse .....	.019

Discovered by J. L. Wortman on Cottonwood creek, Eastern Oregon.

HIPPOThERIUM MONTEZUMÆ Leidy.

Proceedings Academy Philadelphia, 1882, p. 297. *H. rectidens* Cope,
Proceedings American Philosophical Society, 1886, p. 360.

This species is known from two superior molar teeth, one of which is in the possession of Dr. Joseph Leidy, and the other is in my private cabinet. It is nearly allied to the *H. occidentale*, but is smaller, and the enamel borders of the lakes are rather more complex. The internal column is longitudinal in section, and the internal face is slightly concave. The posterior column is quite small, and is well defined from the posterior inner crescent by a deep posterior sinus. Two strong loops project towards the internal column from the adjacent enamel border. The lakes have a deep emargination on each of their distant enamel borders, and a number of loops on their approximated borders. One of these, which represents the largest excurrent loop of other species, is of unusual size and prominence, and is nearly isolated by the constriction of its isthmus. In my specimen it is touched by the apex of an excurrent loop of the posterior lake; in Dr. Leidy's, it can be traced to a connection with the anterior lake, which is probably the normal relation. Lakes not much expanded transversely to the crown.

The crowns of both specimens are prismatic. That of mine is nearly straight; Dr. Leidy's is slightly curved, but not so much so as in the *H. peninsulatum*.

		MM.
Diameters of crown	{ transverse.....	21.5
	{ anteroposterior.....	21.5
	{ longitudinal.....	450.0

From Tehuichila, State of Vera Cruz, Mexico, on the borders of Hidalgo; from a bed of Loup Fork age.

HIPPOTHERIUM PENINSULATUM Cope.

Proceedings American Philosophical Society, 1885, p. 150, Fig. 1.

Crown of superior molar long, curved. Grinding face with anteroposterior diameter considerably exceeding the transverse. Internal column large, its section a narrow anteroposterior oval, with both borders convex. Internal enamel borders of internal crescents with a prominent loop at junction, the posterior one with its posterior loop much smaller than the column. A subquadrate area between the internal parts of the lakes is connected by an enamel ridge with the anterior lake. Opposite and adjacent enamel borders of the lakes, with several close and deep plications, which nearly cut off the adjacent horns. In like manner the posterior horn of the posterior lake, and the anterior horn of the anterior lake are almost cut off by the deep complex infolding of the anterior and posterior borders respectively. The median and anterior external ribs of the crown are well developed, and there is but little cement on the grooves.

	Measurements.	M.
Length of root, less crown	.....	.050
Diameters of grinding face	{ anteroposterior.....	.018
	{ transverse.....	.015

This superior molar tooth indicates a small species of the genus, and one which is entirely typical in form. The plication of the enamel is greater than any other species excepting the *H. gracile*. It resembles the *H. venustum* of Leidy, which is of similar dimensions. In that species the style has a nearly circular section according to Leidy, which distinguishes it satisfactorily. It approximates the *H. montezumæ* in the character of its plications, but the oblong form, small size and greater curvature distinguish it.

From the Loup Fork shales of Tehuichila, Vera Cruz.

HIPPOTHERIUM SPECIOSUM Leidy.

Cope, Bulletin U. S. Geolog. Survey Terrs., No 1, p. 12, Jan., 1874. Report Expl. Surv. W. of 100th Meridian, Vol. iii, p. 322, Pl. lxxv, Fig. 8, 1877.

Hipparion speciosum Leidy. Proceed. Phila. Academy, 1858, p. 27; Extinct Mamm., Dakota and Nebraska, p. 292, Pl. xviii, Figs. 6-10, 1860.

Hippodon speciosus Leidy. Proceed. Phila. Academy, 1854, p. 90.

This species appears to have been pretty generally distributed over Western North America, excepting the extreme Northwest. Among the numerous specimens sent me from Montana and Oregon, I have not recognized any as belonging to this animal. The species has been heretofore known by teeth only, in spite of its relative abundance; but my party in Northern Kansas, under Mr. Hill, obtained an almost perfect cranium accompanied by three cervical, four dorsal and one lumbar vertebrae, and part of the sacrum; with parts of foreleg and foot and one-half the pelvis. A superior molar of a second individual, from the same locality, is accompanied by a mandible with teeth, and bones of various parts of the skeleton. An opportunity for determining the general characters of this horse is now first presented.

Skull—form.—The cranium is about the size of that of the black-tailed deer (*Cariacus macrotis*). The profile of the front is nearly straight, with a slight convexity in front of the infraorbital region. The latter is flat or a little concave in both directions as far on each side as a line drawn anteriorly from the temporal fossae; from these lines it slopes to the orbital border, flat posteriorly, becoming convex anteriorly, strongly so above the lachrymal bones. The profile of the parietal region descends steeply to a point above the meatus auditorius externus, and rising again into a prominent sagittal crest, joins the inion at the extremity of another descending slope. The inion is somewhat truncated at the summit. The anterior part of the sagittal crest is low, and divides at a very acute angle above the middle of the glenoid cavity. The horizontal angle of the malar and maxillary bones is prominent, extending forwards nearly to the anterior part of the first true molar. The preorbital fossa is limited in extent, occupying a position above the infraorbital foramen. Its sides rise gradually except on the upper border, which is abrupt. The muzzle is not excavated anterior to the fossa, but the usual contraction of the border of the diastema is strong. The acumination of the apices of the nasal bones is on their inner sides, and extends as far forwards as the line of the canine teeth. The notch of the nostrils extends to a point above the anterior border of the second (first large) premolar.

The zygomata are slender and little expanded, they are compressed behind. The orbital portion is triangular in section behind, with an external and a superior plane. The orbit is large and a little deeper than wide, the width equaling just one-fourth the distance from its posterior border to the extremity of the nasal bone. The postfrontal process presents its edge outwards and its broadsides directly fore and aft. The occipital region is rather contracted above. Its superior half is occupied by a median keel. The paroccipital process is long, extending considerably below the occipital condyles, and is compressed, presenting its sides outwards and inwards. A narrow strip of the os petrosum is exposed between the occipital and squamosal bones, extending as high up as the postinial fora-

men. The posttympanic process is distinct but short, presenting an obtuse edge outwards, which is separated from the petrous by a groove. The tympanic forms with the superficial layer of the petrous, a tube which encloses the tympanum, and which separates widely the posttympanic and postglenoid processes. The postglenoid is confined to the inner half of the posterior border of the glenoid cavity, and rises obliquely inwards to its apex. The inner border is vertical.

The palate is moderately flat, and is excavated behind as far as opposite the middle of the penultimate molar. The diastema in front of the canine is just half as long as that posterior to it. The width of the palate at the antepenultimate premolar is just twice the width of that tooth. The protuberance of the maxillary bone behind the last molar is about as long as the fore and aft diameter of the last molar. The pterygoid process of the palatine is not very long, and is slightly everted. Its superior border is thickened and somewhat roughened, and descends posteriorly without hamular process. The pterygoid wing of the sphenoid forms a prominent ridge directed downwards and forwards, which encloses the large alisphenoid canal. The pterygoid bone is a delicate scale at the inner side of the pterygoid ala, which extends as far back as the posterior alisphenoid foramen. The basioccipital and basisphenoid are convex in cross-section. The anterior part of the former is compressed, and the posterior part of the latter presents two low truncate tuberosities, outwards, backwards and downwards. The presphenoid region is contracted in the form of a part cylinder, which is underroofed by the laminar posterior part of the vomer, which extends nearly as far posteriorly at the sides as the posterior alisphenoid foramen.

Sutures.—The sutures are distinct in this skull. That separating the premaxillary and nasal bones is considerable, being about half as long as the nasomaxillary suture posterior to it. The nasolachrymal suture is about as long as the nasopremaxillary, and differs from it in being straight instead of convex upwards. The nasal bones are widened behind so as to be decurved laterally to the lachrymal. The posterior nasal sutures are each convex backwards. The lambdoidal suture crosses the sagittal crest in front of the inion and reaches the squamosal at the postparietal foramen. The postfrontal is only in contact with the zygomatic process of the squamosal, and at considerable distance posterior to the malar above, but opposite the posterior inferior slip of the malar. The latter bone extends as far forwards as the middle of the penultimate molar, and rises upwards nearly to the middle of the orbit. The lachrymal bone is a very large one; it is a little higher than the facial part of the malar, and extends a little further anteriorly. Its frontal suture is shorter than its nasal, and extends nearly to the middle of the superior border of the orbit. The premaxillo-maxillary suture passes into the incisive foramen at the canine tooth. The maxillopalatine extends forwards as far as the front of the first true molar, and posteriorly near to the last molar to the shallow groove between the maxillary bone and the pterygoid process.

Foramina.—The infraorbital is of good size, and issues above the posterior part of the fourth premolar. The lachrymal is rather large, and occupies a space but little below the middle of the lachrymal. The posterior infraorbital is large. The supraorbital is double and pierces the base of the postfrontal process. There are two postparietals of rather large size, and at least one large postsquamosal. A well-developed though narrow tentorial ridge defines the position of the lateral venous sinus in front. The mastoid foramen is, as in modern horses, not enclosed posteriorly on its external side, but winds round upwards and forwards, grooving the part of the petrous bone which rises within the mastoid. The *meatus auditorius* is small and the supraglenoid is large, but not so large as the postglenoid. There is but one, a large condylar foramen. The jugular, carotid and oval foramina are not distinguished from the *foramen lacerum*. The *f. f. opticum* and *sphenoorbitale* are distinct and close together; the *f. rotundum* is further back, entering the skull within the alisphenoid canal. The orbitonareal perforation is quite large, and is posterior to the posterior infraorbital canal, not having a common entrance with it as in the species of *Equus*. There is but one palatine foramen on each side, whose posterior borders are nearly in line with the anterior border of the nareal excavation. The incisive foramina do not extend posterior to the position of the nareal excavation. There is a small foramen on the median line just in front of them.

Dentition.—The condition of the teeth shows that the individual described had just reached maturity, since the last molar is not worn on the posterior part of its face. The cups of the incisors are fully enclosed, but the posterior part of the border of the third is not produced quite as far as that of the other teeth, and does not display such results of wear. The cup of the first is filled with cement; of the second and third not fully, but with a median fissure remaining. The size of the incisors decreases from the first to the third, not increases, as, *e. g.*, in *Equus quagga*. The canines are small, and have the equine sharp borders bounded by two grooves of the inner side.

The fourth premolar is two-rooted, but is small and is more than half overlapped by the third. The latter is not remarkably large nor particularly elongate. It is, however, relatively longer than in *H. calamarium*, where it is very wide. The molars diminish posteriorly by very little, the last being distinctly smaller. The internal free column of the molars has a longitudinally oval section, and its middle is a little anterior to the middle of the crown. It has a small apiculate angle directed forwards and outwards. On the large third premolar it has a round section, and joins the internal anterior crescent by a very narrow isthmus. The posterior column is connected with the posterior inner crescent by a narrow isthmus in all the molars, and has in all the flattened form of the anterior column. The lakes as usual are enclosed, and the crescents communicating; this is true of the third premolar as of the others, except that the anterior lake opens forwards and inwards. The adjacent borders of

Measurements of Cranium.

	M.
Length of true molar series.....	.0565
Diameter of second true molar { anteroposterior.....	.020
{ transverse.....	.020
Diameters second premolar { anteroposterior.....	.022
{ transverse.....	.022

Vertebræ.—The axis is preserved except the anterior part of the centrum, which is wanting. The posterior cup is deep and oblique, and the hypapophysial keel is strong, acute and well produced posteriorly. The neural spine is, as usual, a keel which is well produced forwards. Its superior border is thin and is arched, the greatest elevation being a little anterior to the middle. A tuberos ridge descends on each side to the base of the postzygapophysis. The latter are large, and with articular surfaces a little oblique. The parapophyses originate at the middle of the centrum, and are quite narrow and acuminate in form, their apices reaching beyond the line of the superior border of the cup of the centrum. The vertebrarterial canal is not enclosed; it is represented by a groove with a narrow angular edge below. Its anterior marginal perforation is enclosed by a narrow bridge. This vertebra differs from that of *Equus caballus* in the greater anterior extension and greater acuteness and form of border of the neural canal; in the narrowness and deep separation of the parapophysis, and non-enclosure of the vertebrarterial canal.

The seventh cervical is not perforate for the vertebral canal. The extremities of the rather depressed diapophyses are thickened and a little recurved, and their bases send a thin keel posteriorly along the side to the costal articulation. While the cup is subround, the ball is compressed, and its surface extends over the anterior two-fifths of the base of the centrum. The hypapophysial keel is marked and acute, and rises to a tubercle at the middle of its length. The zygapophyses are large, the posterior plane and a little oblique; the anterior more oblique, and a little concave. Neural spine compressed and very short.

The dorsal *vertebræ* are distinctly opisthocoelous, and their sides and inferior edge are gently concave. The hypapophysial keel appears on the posterior centra. The diapophyses have the usual form, are on the superior part of the neural arch, are directed upwards, and support an obtuse metapophysis. Just posterior to their base is situated the double spinous foramen. On posterior dorsals this foramen becomes single and is situated above the line of the base of the diapophysis. In one of the latter *vertebræ* there is a fossa in the anterior costal fossa. The neural spines become very elevated posteriorly, are narrow in front and shallowly grooved behind. The anterior ones are slightly concave in anterior outline. The postzygapophyses are merely oval facets at the base of the spine; the prezygapophyses are not well defined.

The last lumbar is opisthocoelous and has a much depressed centrum. Its diapophyses are very wide in both directions, and bear articular faces

on both the anterior and posterior borders for adjacent diapophyses. The posterior are larger, and are transverse oval. The postzygapophyses are prominent, but narrow; the prezygapophyses have a vertical external face and concave internal face; the superior border is not rolled in as in *Booidea*. No hypapophysis. The anterior two elements of the sacrum are preserved, the rest having been lost. They are thoroughly co-ossified, and the intervertebral foramina are large. The prezygapophyses are like those of the last lumbar. The iliac surface only extends on two centra.

A comparison of the dorsal vertebræ with those of the horse shows that those of this species are more tapiroid in the general isolation of the spinous foramina in the anterior part of the column.

Measurements.

	M.
Elevation of axis at middle .....	.055
“ of spine of do., from roof of arch behind.....	.015
“ of neural canal of do., behind.....	.014
Length of spine on side .....	.049
Width of cup of axis.....	.021
Length of centrum last cervical.....	.045
Diameter ball of do., { vertical .....	.018
{ horizontal.....	.014
Expanse of postzygapophyses do.....	.041
Elevation of neural spine from canal.....	.024
Diameters centrum anterior dorsal { fore and aft. ....	.024
{ anterior { vertical.....	.016
{ transverse... ..	.024
Length of neural spine from canal in front .....	.065
Length centrum of a posterior dorsal.....	.028
Width anteriorly without costal faces .....	.018
Depth “ “ “ “ .....	.017
Length of neural spine from canal anteriorly.....	.107
Diameters last lumbar { long.....	.030
{ anteriorly { vertical .....	.015
{ transverse .....	.023
Anteroposterior width of diapophysis of do. ....	.035
Total expanse of sacrum in front.....	.098
Depth of centrum of do., anteriorly.....	.013
Width of neural canal in front.....	.020

Anterior limb.—About the distal half of the humerus is preserved. Its form is much like that of the horse, the inner side being flat, and the outer concave at the position occupied by the epicondyle when present. The external supracondylar ridge is distinct but not prominent. The trochlear crest has the same position as in the horse, and is rather more prominent. The condylar surface exterior to it is not cut off above and

behind by a groove, as in the horse. The superior grooved boundary of the internal condylar face is better defined. The ulnar and radial shafts are coössified, but the head of the radius is not united with the ulna, though in contact. Distad to this contact, is a considerable interosseous space, relatively longer than in the horse. The line of contact of the head of the radius is convex downwards in the middle. Olecranon much compressed. The carpal articulation of the radius is like that of the horse. The scapho-lunar ridge is transverse; the scaphoid surface recurved below, and a fossa behind the lunar surface. The convex superior surface of the bone has five facets, two of which are more or less lateral.

The left metacarpus and *os magnum* are preserved; the magnum has a relatively smaller transverse diameter than in the horse; its posterior tuberosity is also narrower. The facets of the inter side are much less pronounced than in the horse, the whole being divided by an anteroposterior groove. On the internal side the two anterior or trapezoid facets are as large as in the horse, while the posterior facet of the recent animal is absent from the *H. speciosum*. The magnum facet of the metacarpal is uninterrupted, not divided, as in the horse. The two unciform facets are much more oblique than in the horse. The trapezoides differs considerably from that of the horse. It has but one facet below, and that one is continuous with that of the metacarpal. It sends posteriorly a hook-like process. Above, it encloses no foramen with the magnum. The bevels for the lateral metacarpals are distinct throughout the bone. The posterior face is divided distally by a median obtuse ridge into two shallow gutters, a character not seen in the horse. There is no trace of the trochlear keel on the anterior face of the distal extremity. The section of the shaft at the middle is at least a semicircle. The phalanges of the middle toe have the form usual among these animals. They are rather more slender than in some of the allied species, as *H. isonesum*, and the proximal inferior triangular surface is more produced, reaching to the end of the proximal two-fifths of the length. It forms a large triangular face, concave in the middle.

Measurements of Fore Limb.

	M.
Diameters of humeral condyles	{ anteroposterior at inner side045
	{ " " at middle021
	{ transverse040
Depth of ulna at edge of head of radius019	
Distal width of radius008	
" depth of radius (greatest)024	
Diameters of scaphoid facet	{ anteroposterior016
	{ transverse016
Diameters of lunar facet	{ anteroposterior014
	{ transverse016
Diameters of os magnum	{ anteroposterior023
	{ transverse022
	{ longitudinal011

position, and is much more prominent than the posterior. Its section is subregular oval. The posterior column is a large process of the posterior inner crescent. The lakes are expanded transversely and their remote borders have the usual deep notch. The adjacent borders are very complex with rather shallow inflections, with the usual large loop of the anterior lake represented by two narrow excurrent folds with irregular borders. The crowns wider than long.

MM.

Diameters of grinding face (Leidy) { anteroposterior..... 20
 { transverse..... 23

This species possesses teeth of the *H. speciosum* type, but with such a distinct style of enamel plication as to preclude the idea of identity with that species.

From near Archer, Florida, Dr. Neal.

HIPPOTHERIUM GRATUM Leidy.

Extinct Mammalia of Dakota and Nebraska, p. 287, Plate xviii, Figs. 25, 30. *Hippotherium ingenuum* Leidy, Proceeds. Acad. Phila., 1885, p. 33, Fig.

This species is represented in my collection by two superior molars with lower jaws of three individuals, and two posterior superior molars of another individual from the Loup Fork bed of Northern Kansas. Dr. Leidy examined five superior molars from the corresponding horizon of Northern Nebraska.

These specimens indicate a small species of general affinity to the *H. speciosum*. The internal column is prominent at or before the middle of the crown in position, and of regular oval section. The posterior internal column is small and not prominent, and is well defined externally by a deep sinus. The opposed borders of the lakes are folded into several narrow sinuses, and the loop of the anterior lake is large and subround. The plication is of intermediate character. The posterior face of the crown of the last superior molar is deeply grooved longitudinally. In a pair of these molars which are well worn, the adjacent borders of the lakes have reduced their plications to serrations, and the loop to a prominent convexity. The posterior lobe is still well defined, and the anterior internal column touches the anterior internal crescent. The difference between these and typical teeth is as great as that distinguishing species, but I believe it is due solely to wear. A similar simplification is seen in the *H. paniense* and *H. speciosum*.

MM.

Diameters of a superior molar { anteroposterior 19
 { transverse 18

Diameters of a last sup. molar, little worn { anteroposterior. . 19
 { transverse. 14

Diameters of a last sup. molar, much worn { anteroposterior.. 18
 { transverse. 16

The mandibular rami which probably belong to this species present the character of an uninterrupted series of canine and incisor teeth. The symphysis is contracted, and the rami increase rapidly in depth. The diastema is long. No trace of fourth premolar.

Measurements.

	MM.
Length of symphysis.....	37
" " diastema.....	46
Depth of ramus at posterior border of p. m. iv.....	40

HIPPOTHERIUM RETRUSUM Cope.

This species is represented in my collection by eight molars, two from one and six from another animal. These are associated with two superior molars with somewhat different characters, which are intermediate between those of *H. gratum* and *H. speciosum*. All were found in the same locality, but separated from their positions in the skull. The two molars first above mentioned are about half worn, and present the characters of the species best. The other six (with one exception) are less worn, and present a less complex folding of the enamel plates. Five of them are from one side, and one (more worn) from the other side of the jaws.

The character by which the superior molars of the *Hippotherium retrusum* may be readily distinguished from those of all other species of the genus, is the extraordinary posterior extension of the anterior internal column, which brings it first into contact with the posterior internal column, and then on greater wear unites the two by an isthmus. In the first true molar the area of the column is in contact at its extremities with both the posterior column and the anterior inner crescent, leaving a narrow oval area (or lake) within it, cut off at both extremities. In the second molar the column is only in contact with the posterior internal crescent, with which it is united by an isthmus. In both the molars the posterior inner column is well distinguished by the usual deep sinus from the posterior inner crescent. The character above described is an exaggeration of what is distantly approached by the last superior molar in some of the species.

The complexity of the enamel border of the lake is of medium degree. The anterior lake has on its posterior border a large more or less completely isolated wide loop. Exterior to it the adjacent borders of both lakes are thrown into narrow anteroposterior folds. No fold on remote border of anterior lake, and a weak one at the corresponding position on the posterior lake. A short small loop towards the internal column on m. ii. The crowns are robust, of medium length, and curved. That of the second true molar is rather longer than wide; the first true molar is about as wide as long.

Measurements of Superior Molars.

		MM.	
Diameters m. i	{	anteroposterior.....	19
		transverse.....	18.5
		longitudinal.....	26
Diameters m. ii	{	anteroposterior.....	20
		transverse.....	18
		longitudinal.....	36

The anterior inner column presents in the second individual the same flattened form as in the first above described, but it is connected with the anterior crescent by a narrow isthmus, and not in two of three teeth at least, where the part is preserved, with the posterior crescent. The anterior molar (third premolar from behind) has this junction a complete fusion of the two. As one of these teeth is a true molar it is possible that they represent another species.

The animal last described may possibly belong to a species distinct from the *H. retrusum*, and perhaps to a species of *Protohippus* or *Hippidium*. If so, it differs from the known species of those genera in the posterior position and flatness of the anterior column. In that case it may be called *P.* or *H. profectus*. It approaches nearer to *Equus* than any known species of those genera.

Measurements of No. 2.

		MM.	
Diameters of p. m. i	{	anteroposterior.....	45
		transverse.....	23
		longitudinal.....	19
Diameters of m. iii	{	anteroposterior.....	24
		transverse.....	20
		longitudinal.....	36

In dimensions this species is then about equal to the *H. speciosum*.

From Phillips county, Kansas, from the Loup Fork bed. Frank Hazard.

HIPPOTHERIUM PANIENSE Cope.

Bulletin U. S. Geolog. Survey Terrs. (Hayden), No. 1, 1874, p. 12. Annual Report U. S. Geolog. Survey Terrs., 1873 (1874), p. 522.

This species is known from molar teeth from the Loup Fork beds of N. E. Colorado. The enamel borders differ in their degree of complexity according to the amount of wear to which they have been subjected.

In the molar which presents the more simple type of enamel borders, the posterior internal column is entirely fused with the posterior inner crescent. The anterior inner column is therefore alone. It is nearly round in section, and presents no angular apex towards the inner crescents, and there is only a trace of the loop which is usually directed towards it from the enamel border connecting the crescents. The borders

of the lakes only show indication of plication on their adjacent faces; here the anterior has traces of three loops and the posterior of one. Cementum full within and without.

A second superior molar is not so much worn, and displays more plication of the enamel plates. The crown is curved and not elongate. The posterior inner column is not lost, and the anterior column is not so round in section, but is a short oval. It presents no angle towards the enamel borders of the inner crescents, but there projects a single small loop opposite the middle of the column. The folds of the lakes are confined to their adjacent faces, thus agreeing with the tooth No. 1. The folds are also very few, but much deeper than in No. 1. On the posterior lake there are three, the inner one deep; on the anterior lake, one deep one, and another rather deep entering from the inner side approaches it. Slight undulations of the posterior border of the posterior crescent take the place of the folds of other species.

The *Hippotherium paniense* evidently differs from the other species in the coincident cylindric form of its internal column, with the greater simplicity of its enamel plates.

Measurements.

	No. 1.	M.
Length of crown on middle of side.....		.012
Diameters grinding face {	anteroposterior.....	.020
“ {	transverse.....	.021
“ inner column.....		.005
No. 2.		
Length of crown on middle of side.....		.016
Diameters grinding face {	anteroposterior.....	.019
“ {	transverse.....	.020
“ of inner column.....		.005

I obtained the teeth of this species in 1873 from the Loup Fork beds of the Pawnee Buttes in Northeastern Colorado.

HIPPOTHERIUM VENUSTUM Leidy.

Proceedings Academy Phila., 1853, vi, p. 241; Holmes, Post Pliocene Fossils of South Carolina, 1859, p. 105, Plate xvi, Figs. 32-3.

For the character of this species I am compelled to rely on Leidy's figures above cited, as the description at the latter reference cited (there is none at the first) gives no assistance.

According to the figures in question, the anterior internal column is median in position, and is nearly round in section. The posterior internal column is small and loop-shaped in section. A single narrow loop of the middle enamel border is directed towards the anterior internal column. The lakes both have the usual inflection of the border on their remote

sides. The adjacent borders are much inflected with simple deep folds, and there is not represented to be any material difference between the larger loops towards the inner sides of the lakes.

The species is one of the smallest of the genus, being about equal to the *H. peninsulatum*. The crowns are represented to be elongate and but little curved. Grinding face longer than wide, 19 by 17 mm.

Deposits of Ashley river, near Charleston, South Carolina. The fossils of this deposit are of mixed ages, so that it is impossible to fix its true horizon with certainty.

HIPPOTHERIUM RELICTUM Cope.

American Naturalist, March, 1889.

Crowns of superior molars as broad as, or broader, than long, rather short and moderately curved. Anterior internal column with a broadly oval section, without angle, and well separated from adjacent enamel borders. Posterior internal column on the first true molar, projecting as far inwards as the anterior, but broadly connected with the posterior internal crescent. It is not so far inward in the last superior molar, with which it is connected by a rather narrow isthmus. The enamel border of the lakes is very simple, consisting in the first true molar of one or two emarginations of the adjacent faces, and one or more of the remote margins. A loop of the posterior internal border of the lakes is outlined. A small loop directed towards the anterior internal column. Cementum layer thick.

Dimensions of Molars.

		MM.
Diameters m. i	{ anteroposterior.....	16
	{ transverse.....	19
Diameters m. iii	{ anteroposterior.....	17
	{ transverse.....	18.5
Diameters m. i, inferior	{ anteroposterior.....	17
	{ transverse.....	8
Diameters m. iii, inferior	{ anteroposterior.....	18.5
	{ transverse.....	8

From a Lower Pliocene bed (? Idaho terrane) of the eastern part of Oregon. George C. Duncan.

HIPPOTHERIUM SPHENODUS Cope.

Hippotherium speciosum Leidy, Cope, Bulletin U. S. Geol. Survey Terrs., No. 1, 1874. Annual Report U. S. Geol. Survey Terrs., 1873 (1874), p. 522; not of Leidy.

Two superior molars of this species were obtained by me in the same locality as that furnishing the *H. paniense*, and at the same time. Several years later I obtained two other molars from the same place, viz., the Pawnee Buttes of N. E. Colorado.

Their characters are somewhat similar to those of *H. speciosum* in the plications of the enamel, but the form of the internal columns is entirely distinct, referring the species to the group of the *H. calamarium*. The latter species is, however, distinguished by the very short wide form of the anterior teeth, especially of the second premolar. While noting this character in the Report of Lieut. Wheeler, as above cited, I did not regard it as specific. Having obtained another similar specimen, I am now inclined to attach more importance to it. It indicates that the *H. calamarium* exhibited a greater facial concavity at the diastema than any other species known from this country.

In this species the anterior distinct column has an oval section with an angle directed to the anterior inner crescent. The enamel border connecting the crescents sends towards the column two loops. The borders of the lakes are plicate on their inner and adjacent sides. The front of the anterior lake has a deep notch, and three still deeper ones enter from the posterior inner border. There are two others on the posterior outline. The adjacent face of the posterior lake has four inflections, and there are two deep ones on the posterior part of the inner border. The posterior crescent sends an angle backwards, which is separated from the posterior inner column by a deep notch. The third premolar is narrowed and somewhat produced forwards, and its anterior inner column though distinct is reached by the narrow loop of the inner enamel border. The anterior inner crescent is peculiar in being distinct and isolated, so that the cementum of the anterior lake communicates with that covering the anterior inner side of the tooth. In the second and less worn specimen, the two lakes also have a narrow communication. The former character is found in *H. calamarium* and *H. isonesum*, but not in *H. speciosum*.

Measurements.

	No. 1.	M.
Diameters crown third premolar	{ longitudinal .....	.018
	{ anteroposterior.....	.025
	{ transverse at column....	.019
Diameters crown left molar	{ longitudinal .....	.015
	{ anteroposterior.....	.022
	{ transverse .....	.021
No. 2.		
Diameters crown second premolar	{ longitudinal .....	.028
	{ anteroposterior .....	.025
	{ transverse at column..	.014
Diameters crown right superior molar	{ longitudinal.....	.019
	{ anteroposterior .....	.022
	{ transverse at column	.022

The specimen No. 1 equals that of *H. speciosum* in dimensions; No. 2 is a little larger.

HIPPOTherium CALAMARIUM Cope.

Annual Report of U. S. Chief of Engineers, 1875, ii, p. 990. Report U. S. G. G. Survey W. of 100th Mer., G. M. Wheeler, p. 321, Pl. lxxv, Figs. 1-2.

With this species we enter the group characterized by the general equality in size and form of the anterior and posterior internal columns of the superior molars, and the presence of a rudiment in the anterior column, of an isthmus corresponding with that one which connects the posterior inner column with the posterior inner crescent.

The *H. calamarium* has been found especially abundant in the Loup Fork bed of Pojuaque near Santa Fé, New Mexico, and I have a portion of a maxillary bone supporting two molars, from the corresponding horizon of Northeast Colorado, which may be placed here provisionally in the absence of the third superior premolar. The borders of the lakes are of medium complexity only, and the posterior loop of the anterior lake is rounded, and is not much constricted. The anterior inner crescent of the third (anterior) premolar is isolated. This tooth differs from the corresponding one of the *H. sphenodus* and the *H. isonesum* in its short, wide form. Should the latter character be found not constant, I do not know of any way of distinguishing it from the latter. In the former the posterior internal column is less prominent and smaller, much as in *H. speciosum*, etc. Cementum layer thick. Crowns nearly square, short, curved.

Measurements of Specimen from Colorado.

		MM.
Diameters of m. i	{	anteroposterior 24
	{	transverse 24

HIPPOTherium ISONESUM Cope.

Hippotherium seversum Cope, Proceeds. Amer. Philos. Society, 1886, 359, not of 1878, p. 76.

Judging from the relative abundance of specimens, this was the common species of the far Northwest of the United States during the Upper Miocene period. I have the large part of a skeleton with skull from Cottonwood creek, Oregon; parts of maxillary bones with teeth of a second individual from the same locality, with some teeth of a third from the same. There are a good many teeth of the same species from the Ticholeptus bed of the valley of Deep river, Montana, a number of which belong to one individual.

In the subequal characters of the two inner columns of the superior molars, the species betrays an approach to Protohippus, which is emphasized by the angular projection of the anterior column towards the anterior internal crescent. The two however never join, and only come into contact in one instance, in the third premolar of a Montana specimen.

As the skull belongs to an animal not quite adult, I describe the dental characters from the second individual mentioned as having been sent from the same locality in Oregon. In this one it is observable that the inner edges of the cups of the incisors are well developed, but the latter are only partly filled with cementum. The fourth premolar is two-rooted and is half overlapped by the third. The latter is of usual form, produced anteriorly. The anterior inner crescent is distinct from the posterior inner, but is narrowly connected with the anterior outer. The lakes have a narrow communication. In the molars of typical form the posterior internal column is almost cut off from the adjacent crescent by the deep posterior notch or loop, which also narrows the posterior crescent at this point. The borders of the lakes are not much complicated in this specimen. They display on the third premolar only one well-marked inflection on their adjacent faces, and two (one minute) on the posterior part of the internal border in both. The posterior extremity of the posterior internal crescent sends an angle inwards along the edge of the crown. One or two loops point towards the internal column.

In the Montana series, the premolars and first true molar of one side are preserved, and two true molars of the opposite side. Their crowns are less worn than those just described, and the enamel borders of the lakes display more numerous inflections. Thus the anterior border of the posterior lake has three deep inflections, while the adjacent boundary of the anterior lake has but one; this one however bounds a loop by nearly joining another deep notch entering from the inner posterior direction. Then there is a deep notch in each lake coming from the direction of the anterior and posterior margins of the crown respectively. One loop extends towards the inner column.

In the Oregon skull, already mentioned, the superior molars display different degrees of wear in such a way as to be very instructive. The premolars are least worn; and in them we observe (1) that the posterior internal column is distinct from the adjacent crescent like the anterior one; (2) that the mutual connections between the internal crescents are very narrow; and (3) that the inflections of the borders of the lakes are few and shallow. In the second true molar, which is a little more worn, there is one deep inflection on the adjacent border of each lake, of which the anterior one nearly cuts off a loop by approaching a notch from the inner side. In the first true molar, which is, of course, the most worn, the posterior lake has the full number of three notches on its anterior border.

The masticating surface of the molars of this species is worn into transverse angular grooves and ridges more distinctly than in any other species of the genus.

The *cranium*, already mentioned, is somewhat distorted by pressure, but many characters are clear. The facial concavity is different from that of *H. speciosum* in its greater size and more posterior extension, and also in its expansion downwards to the maxillo-malar ridge, as in certain

species of *Protohippus*. The postorbital process turns its edge outwards. The external extremity of the glenoid cavity is quite prominent. The posttympanic process is short and acute. The palatine foramina are opposite the posterior edge of the first true molar. The supraorbital foramen is large and distinct. The infraorbital foramen issues above the middle of the fourth premolar. The palate is as narrow as in *H. calamarium*, but the premolar teeth are narrower; the greatest transverse diameter of the second premolar in *H. isonesum* is two-thirds that of the palate between them while it is equal in *H. calamarium*.

Measurements of Skull.

	M.
Length from incisors to occipital condyles .....	.328
“ “ to glenoid surface (axial).....	.257
“ “ to end of os maxillare.....	.210
“ “ to p.m. iv (axial) .....	.068
“ “ to canine “ .....	.037
Transverse diameter of orbit.....	.044
Width at paroccipital processes.....	.024
“ between first true molars .....	.044
“ “ second premolars.....	.030
“ at diastema near p.m. iv.....	.028
Long diameter p. m. iv .....	.013
Diameters p.m. iii { anteroposterior.....	.024
{ transverse (at column).....	.014
Diameters m. i. . { anteroposterior .....	.019
{ transverse.....	.019
Long diameter of crown of I. i.....	.013

The only *vertebra* of this individual, which is well preserved, is an atlas. This one has the general proportions of that of the horse, but differs materially in the less anterior extent of the transverse process. This does not, as in the horse, enclose the anterior arterial foramen, which is therefore represented by a notch. The hypapophysis is well marked, and the condyloid cavity deeply notched on the external side. The first dorsal is strongly opisthocœlous, its ball is subquadrate. There is a strong obtuse hypapophysial ridge. The anterior capitular articulation is large and flat.

The last two lumbar are preserved somewhat injured. They are united mutually and with the first sacral by rather large articular surfaces of the diapophyses. The penultimate has an obtuse hypapophysial keel, which is less distinct in the last one.

Measurements.

	M.
Length of atlas on side.....	.052
Expanse of atlas transversely .....	.086
Width of canal behind.....	.023

Measurements.

	M.
Diameter of ball of d. i	{ vertical ..... .018
	{ transverse..... .018
Diameters of ball of a posterior lumbar	{ vertical..... .016
	{ transverse ..... .027

The larger part of the *pelvis* is preserved. It agrees with that of *H. speciosum* and differs from that of the horse in the subcylindric pubes, but it differs from that of the former in having the peduncles of the ilium flatter or deeper fore and aft. The peduncles of the ischium are robust, and are concave on the outer and convex on the inner side, less convex, however, than in the horse. The obturator foramen is a more elongate oval.

Measurements.

	M.
Length of ilium .....	.150
“ of pubis .....	.045
“ of obturator foramen .....	.040
Width of ischia at end of foramen.....	.060
“ of acetabulum vertically.....	.033

Both *femora* are preserved. They display the usual equine characters of long great trochanter and large third trochanter, which is half opposite the inferior half of the prominent keel-shaped small trochanter. The shaft is robust, rather compressed and slightly curved fore and aft. Its section at the middle is an anteroposterior oval. The internal crest of the rotular groove is higher than the external posteriorly, and projects as well a little inwards; it is not, however, developed to anything like the extent seen in the horse. The rotular groove is rather wide and is cut off from the external condyle only by a fossa. The intercondylar fossa is rather wide. The supracondylar fossa is large and of subcircular form; it marks one-third the distance between the condyle and the third trochanter.

Measurements of Femur.

	M.
Total length (axial) .....	.260
Elevation of great trochanter .....	.030
Length from apex of great trochanter to middle of third trochanter .....	.096
Width at head.....	.068
“ “ third trochanter (middle) .....	.052
“ of shaft at middle.....	.022
“ at condyles.....	.050
Transverse diameter of shaft at middle.....	.031

The *tibia* is not so robust in its proportions as that of the horse or quagga, but is about as in the *Anchitherium prastans*. It is smaller than

the tibia of the latter, although the sizes of the crowns of the teeth in the two species is about the same. The crest is narrower and more prominent than that of the horse and quagga, and similar to that of the *A. præstans*. It differs from that of the latter in the entire coössification of the distal extremity of the fibula and entire absence of the splint-like shaft seen in the adult *A. præstans*. The spine is well marked and widely divided, and the external anterior notch is deep. The popliteal fossa is well marked. The shaft is flattened from side to side, and presents an obtuse edge outwards along the middle of its length. It is not marked by muscular and other impressions as in *Anchitherium præstans*. The distal end is much like that of the species just named; both differ from those of the horse and quagga in having the internal tuberosity of a more oblong form and less prominent.

Measurements of Tibia.

	M.
Total length .....	.253
Diameters of head {	
anteroposterior .....	.047
transverse .....	.060
Diameters of middle of shaft {	
anteroposterior .....	.020
transverse .....	.028
Diameters of distal extremity {	
anteroposterior .....	.023
transverse .....	.041

The *tarsus* is represented by calcaneum, astragalus, navicular and ectocuneiform. The first two do not differ from the corresponding bones of an undetermined Protohippus beyond their somewhat smaller size, excepting in the better developed calcaneal facet on the external margin of the astragalus. The astragalus agrees with that of the undetermined Protohippus, and differs from that of the horse in three points: (1st) The less extension inward of the distal tuberosity and navicular facet; (2d) the greater compression of the trochlear keels; (3d) the distinct extension of the prominent inferior margin of the internal superior trochlear smooth surface, to the internal distal tuberosity. The quagga is intermediate in these points. The facets of both surfaces of the navicular are not so much subdivided as in the horse, but more so, as to the upper surface at least, than in the *Anchitherium præstans*. Its anterior portion is not so expanded outwards as in the horse, but is considerably more so than in *A. præstans*, and about as in Protohippus. The same statements apply to the ectocuneiform. The superior facets are divided as in the horse, but inferiorly the posterior facet is a branch of the anterior, not distinct from it as in the living species.

Measurements of Tarsus.

	M.
Length of calcaneum .....	.070
" " sustentaculum .....	.049
Greatest width of calcaneum .....	.030
Depth of sustentaculum at middle .....	.028

<i>Measurements of Tarsus.</i>		M.
Greatest diameters of astragalus	{ anteroposterior .....	.038
	{ transverse .....	.035
Width between centres of trochlear crests.....		.015
Transverse extent of navicular facet.....		.021
“ “ “ cuboid.....		.006
Diameters of navicular	{ longitudinal .....	.008
	{ anteroposterior.....	.024
	{ transverse .....	.027
Diameters of ectocuneiform	{ longitudinal .....	.007
	{ anteroposterior .....	.019
	{ transverse .....	.025

The *metatarsals* are smaller than those of the undetermined Protohippus and still smaller than those of *Anchitherium præstans*. The third is of generally similar form in all three of the species, though the proximal extremity has not quite so much anteroposterior width in *H. isonesum* as in the other species. In all of them it is more convex than in the horse. It also differs from that of the horse in not having the posterior facet cut off from the anterior. It is partially cut off by a deep sinus in this species and the undetermined Protohippus, which sinus is only represented by a notch in *A. præstans*. The lateral metatarsals are slender medially as in the undetermined Protohippus, and not so stout nor so much compressed in *Anchitherium præstans*. They do not quite reach to the articular surface of the median metatarsal, being a very little shorter than in the Protohippus and *Anchitherium* mentioned. The phalanges of the *H. isonesum* have about the same diameter as those of the undetermined Protohippus, but they are distinctly shorter, especially the pastern. The coffin bone differs from that of the same species in the smaller size of the proximal lateral fossæ.

<i>Measurements of Foot.</i>		M.
Length of m. t. iii.....		.175
Proximal diameters m. t. iii	{ anteroposterior .....	.019
	{ transverse.....	.025
Diameters shaft m. t. iii	{ anteroposterior.....	.015
	{ transverse.....	.018
Distal diameter m. t. iii	{ anteroposterior.....	.019
	{ transverse.....	.021
Length m. t. iv .....		.159
Anteroposterior diameter m. t. iv, proximally.....		.020
“ “ “ ii, “ .....		.014
“ “ “ ii, medially.....		.006
Length of pastern laterally.....		.033
Width of do. distally.....		.019
Length of coronary on side.....		.025
Width of do. distally.....		.019
Length of coffin bone in front.....		.031
Expanse of do. posteriorly.....		.030

This three-toed horse was of about the size of the *Hippotherium speciosum*, which I have already shown to have been equal to the prong-horned antelope, but of somewhat different proportions.

This species stands in a certain relation to the *Protohippus insignis* Leidy, a species which is common in the Eastern beds of Loup Fork age. Should the anterior internal column unite with the anterior internal crescent, thus developing the character of the genus *Protohippus*, it is doubtful whether the two species would be distinguishable by the dentition. I have not seen, however, any intermediate specimens, and the two species occupy different geographical areas. A somewhat similar relation exists between the *H. sphenodus* and the *P. perditus*, but in the former the enamel lake borders are much more complex.

HIPPOTHERIUM SEVERSUM Cope.

Stylonus severus Cope, Paleontolog. Bulletin, No. 30, p. 14. Proceed. Amer. Philos. Society, 1878, p. 76.

The *H. severus* was originally described from a superior molar, which though worn over the entire grinding face of the crown still retains the posterior column distinct from the posterior inner crescent. On this account I distinguished the species generically from *Hippotherium* under the generic name *Stylonus*. I think, however, that a little further wear would reveal the union between the two parts of the crown above mentioned, which would then present characters not distinguishable from those of *Hippotherium*.

Crown of superior molar moderately elongate and curved. Grinding face subquadrate. External ridges prominent. Section of anterior internal column oval, with an apex directed outwards at a short distance anterior to the single internal median loop. Posterior internal column also oval in section, distinct from posterior internal crescent, and without apiculate angle in specimen at present state of wear. Crescents narrow, separated by rather wide lakes entirely filled with cementum. Lake borders simple; anterior with a trace only of anterior notch; posterior with a strong posterior notch. Opposed adjacent borders with one notch on the posterior and two on the anterior crescents, the latter enclosing a small loop in the usual position. External cement layer rather thin.

Measurements.

	MM.
Diameters crown {	anteroposterior..... 18
	transverse..... 17
	longitudinal..... 28

Ticholeptus bed of Cottonwood creek, Oregon; Dr. J. L. Wortman.

This species differs from both the *H. isonesum* and *H. calanarium* in its inferior dimensions, and in the simplicity of its enamel lake borders.

EXPLANATION OF PLATES.

Figures of superior molar teeth of species of *Hippotherium*, natural size.

- Fig. 1. *Hippotherium occidentale* Leidy ; superior molar, from Cottonwood creek, Oregon ; internal view ; *a*, grinding face.
- Fig. 2. *H. sinclairii* Wortman ; inner view ; *a*, grinding face.
- Fig. 3. *H. relictens* Cope ; side view ; *a*, grinding face.
- Fig. 4. *H. peninsulatum* Cope ; side view ; *a*, grinding face.
- Fig. 5. *H. speciosum* Leidy ; including canine and incisor teeth. From Kansas.
- Fig. 6. *H. plicatile* Leidy ; grinding face ; from Leidy.
- Figs. 7-8. *H. retrusum* Cope ; first and second molars, grinding faces ; *a*, posterior view of 7. From Kansas.
- Figs. 9-12. Superior molars doubtfully referred to *H. retrusum* or to *Protohippus* or *Hippidium profectum* ; grinding faces. From Kansas.
- Figs. 13-14. *H. paniense* Cope, from Colorado ; *a*, posterior view of 13.
- Fig. 15. *H. calamarium* Cope, from New Mexico ; from Cope in Report Expl. Surv. W. of 100th Mer. ; G. M. Wheeler.
- Figs. 16-17. *H. gratum* Leidy, from Kansas ; *a*, anterior view of 16, which is an m. iii, little worn. 17. *a*, posterior do. of 17, much worn.
- Fig. 18. *H. venustum* Leidy, from South Carolina ; grinding face ; *a*, interior view. From Leidy.
- Figs. 19-20. *H. relictum* Cope, from Oregon ; *a*, anterior view of 19.
- Figs. 21-22. *H. sphenodus* Cope, from Colorado. 22. Anterior premolar.
- Fig. 23. *H. isonesum* Cope, from Oregon ; including canine and incisor teeth.
- Fig. 24. *H. seversum* Cope, from Oregon ; *a*, posterior side.

Note on Hippotherium relictens. By E. D. Cope.

In the preceding monograph of the genus *Hippotherium*, I have stated that the *H. relictens* Cope is probably founded on a tooth of the *H. montezumæ* Leidy. A renewed examination of the type of the former convinces me that I was premature in reaching this conclusion. Besides the straightness of the crown, the *H. relictens* possesses a peculiarity not shared by any other species of the genus. The loop, or principal lobe of the lake margins, belongs to the posterior lake, and not to the anterior lake. The latter is its connection in *H. montezumæ*, and in all other species of the genus known to me. It is represented on Plate i, Fig. 3.

An Account of the Congo Independent State.

By Henry Phillips, Jr.

(Read before the American Philosophical Society, November 2, 1888, and February 1, 1889.)

HISTORY.

The creation of the Congo Independent State may be considered as one of the most curious and most characteristic episodes of the nineteenth century. All settlements formerly made in unexplored countries were the results of missionary labors, or of wealth- or fame-seeking adventurers. Motives of policy on the part of European governments then came into play to facilitate the reduction and colonization of the new-found lands. To no such causes was the founding of the Congo Independent State indebted, neither religious fervor nor thirst of gold caused it to see the light. The philanthropy of the King of the Belgians, together with his love of geographical explorations, were to be the means of pouring the light of civilization upon "the dark continent."

It was not even upon the soil of Africa that the Congo Independent State took its origin: its birth place was at Bruxelles, in the palace of a monarch.

On the 12th of September, 1876, King Leopold the Second, of Belgium, held at his royal residence, in Bruxelles, a conference of the most celebrated modern geographers and the most famous explorers of all nations, to discuss and to formulate the best methods of planting firmly on the soil of the African continent the standard of civilization. This assemblage laid the foundation of the "*Association Internationale Africaine*," which subsequently selected for the field of its labors that portion of "the black continent" lying between the western coast and the great lakes of Central Africa.

Two years later, on November 25, 1878, under the auspices of His Majesty, was held a second congress, "*Le Comité d'études du Haut-Congo*," whose object was to penetrate barbarous Africa by ascending the Congo river, whose course had lately been ascertained by Stanley, and to seek practicable means of establishing regular communications along the Upper and Lower Congo, and to create amicable relations for commercial purposes with the tribes that dwelt in the interior, offering to them, in exchange for their objects of value, the varied productions of European industry. Under the auspices of this Society, formed of English, French and Belgian philanthropists and capitalists, the explorer, Stanley, undertook his voyages. The amicable measures pursued by the agents of the Association caused the indigenous populations to look with a friendly eye on the new scheme, and an uninterrupted chain of stations was created

and maintained along the whole course of the river; no violence, no usurpations, no disrespect of the rights of the native chiefs were permitted, none took place, and the result was the peaceable establishment of settlements whose future was assured.

The philanthropic and scientific ends of the "*Comité d'Etudes*" became interwoven with a political idea, that of founding in the very heart of Africa an immense independent State, and the Comité changed its name and became henceforth "*L'Association Internationale du Congo*." Under this title the Society redoubled its efforts, and by the end of the year 1883, it had concluded with the various independent chiefs of the Congo basin, and that of the "Niadi Kwilu," more than one thousand treaties, by which the native chieftains ceded to it all their territorial rights over the immense domains included within the before-mentioned boundaries.

It now remained only to obtain from the civilized nations some recognition of this new arrival among States; the very first successful negotiations to that effect were with the United States of America; on the 10th of April, 1884, the Senate of the United States authorized the President to recognize the standard of the International Association of the Congo as fully as that of any other friendly government. On November 8, 1884, the Emperor of Germany authorized a similar recognition. Subsequently the conference at Berlin was opened "to regulate, in an amicable spirit and with cordiality, the conditions that could assure the development of the commerce of the Congo, and arrange for the prevention of errors and mutual misunderstandings." Diplomatic relations were sought with all the powers that had sent agents to this conference, resulting in the ultimate recognition, by them, of the new State, and, on February 26, 1885, *The Congo International Association* itself gave in its adherence to the resolutions formulated by the conference. Prince Bismarck, in announcing the recognition at the end of the conference, said, "I think that I may express the sentiments of this assemblage in saluting, with satisfaction, this act of the Congo Association. To the new State is to be entrusted the work that we have outlined, and I breathe my most hearty wishes for its prosperous development and for the fulfillment of the grand ideas of its illustrious and noble founder."

But one thing now remained, the official nomination of the sovereign of the Congo Independent State; a choice already made by the logic of accomplished facts and the unanimous voice of public opinion. With a universal approbation, His Majesty, Leopold II, desired his ministers to recommend to the chambers to pass a law, that, in conformance with Article LXII of the Belgian Constitution, would permit him to accept the sovereignty of another State, and the authorization was granted in the following terms: "Sa Majesté LEOPOLD II, Roi des Belges, est autorisé à être le Chef de l'Etat fondé en Afrique par l'Association Internationale du Congo. L'Union entre la Belgique et le nouvel État sera exclusivement personnelle."

On the 1st of August, 1885, His Majesty, Leopold II, King of the Bel-

gians, notified the powers of the foundation of the Congo Independent State.

THE BERLIN CONFERENCE.

While the Association Internationale Africaine was opening the route to Central Africa, *via* Zanzibar, the Comité d'Etudes du Haut-Congo was carrying on its explorations along that river, and the Association Internationale du Congo was investigating the basin of the Congo and acquiring territorial domains and rights of sovereignty. Portugal still asserted her ancient although shadowy and undetermined pretensions over the western coast and the interior. England sided with Portugal, and France, entering by the river Ogooué, sought to become master of the river beyond the stations already established by the Association; Germany seized a number of points on the western coast, and commercial houses founded by Dutch, English, Germans and Americans continued their operations on the Lower Congo or the sea coast, and their mutual encroachments could, at any moment, give rise to their respective governments, a pretext for intervention, and become a source of grave trouble, danger, and even of bloodshed. In order to compose these conflicting interests, France and Germany took the initiative towards assembling a conference, at which should be represented all the nations that had commercial relations on the Congo; fourteen powers responded, *viz.*, Germany, Austria-Hungary, Belgium, Denmark, Spain, the United States of America, France, Great Britain, Italy, The Netherlands, Russia, Sweden and Norway, Portugal, and Turkey.

The conference opened at Berlin on November 15, 1884, and on February 26, 1885, the plenipotentiaries of the powers assembled, signed an act of which the following is a resumé.

Liberty of Conscience is assured by the first section for the whole immense basin of the Congo, which is admitted without being confused by natural, orographic boundaries; for twenty years no entry-duties shall be charged on any goods. The Association Internationale du Congo has, in its treaties with the principal nations, declared that at no time shall any import duties be levied within its possessions. An export duty representing from 3 to 4% of their commercial value is levied by the Congo Independent State on eight indigenous products. All privileges of exit are likewise granted without any favoritisms to flag or cargo. All strangers are to have equal rights of liberty, freedom of conscience; the aborigines are to be protected in the peaceful possession of their rights and property.

The perpetual proscription of slavery is a fundamental dogma of public law in all the colonies situated in the basin of the Congo; no slave shall be permitted to be sold, no slave mart to be established, on the territory.

The States that have arisen or may arise in the basin of the Congo, and the powers desirous of colonizing, have a right to declare such colonies

under the protection of neutrality, either perpetual or temporary. The Congo Independent State has availed itself of the privilege and has declared *itself forever* to be a neutralized State.

The navigation of the Congo and of its affluents is to be free. No fluvial or maritime toll is to be established along its course. Taxes must only be sufficient to compensate for the expenses of keeping the river navigable and of keeping up the establishments placed on its banks. An International Committee, at which all the high contracting powers have the right of being represented, is to be especially charged with supervising the liberty of navigation and transit upon a footing of the strictest equality; it must also keep the streams, etc., in good condition, and carry on all necessary work of all kinds which, in time of war, shall be held inviolable and not to be disturbed.

The Congo is to remain navigable, *even in war-time*, to vessels of all nations, whether belligerent or neutral, and *private property is to be respected even if under an enemy's flag*.

The navigation of the Niger and its affluents is rendered free under the same stipulations as that of the Congo, except that the administration of the river is entrusted to those owning Riparian rights, with authority to act separately.

Conditions of future occupancy. All future taking possession of territory on the coasts of Africa must be publicly notified, and to be effective must be actual.

Modifications and changes are provided for in the last section of this Act, which must be agreed to by the powers in conference, and other States may be admitted to this agreement upon an equal footing.

LIMITS, POPULATION, ETC.

The boundaries of the Congo Independent State are: 1. *On the north*, by the French and Portuguese possessions, determined by the course of the Tshiloango, the Congo and the Ubangi, up to the junction of the fourth parallel, north latitude, with the thirtieth degree of longitude east from Greenwich. 2. *On the east*, by a line following the latter degree to the north-eastern shore of Lake Mwutu Nzige, and to the eastern borders of Lakes Tanganyika, Moëro and Banguelo. 3. *On the south*, by the dividing ridge between the basins of the Congo and the Zambese to the twenty-second degree of longitude east of Greenwich; then from south to north by the line of the waters of the River *Kassai* to the sixth parallel of south latitude, along which it runs to the sea. 4. *On the west*, by the Atlantic ocean, from the mouth of the Congo to the Bay of Cabinda.

The territory embraced within these limits comprises two millions of square kilometres, and is estimated to contain some twenty millions of inhabitants, or about ten to the square kilomètre.

The tribes dwelling within this region are independent and are subject each to its own chief, to whom Europeans usually give the title of king, although his subjects may be but few in number. As a rule, the dwellers near the coast are of a peaceable disposition, but of course those more

remote from contact with the whites are more savage and more bellicose. Some of these tribes are man-eaters, and it is stated that, curiously enough, the people who practice this custom are neither among the most ferocious nor those the least amenable to the influences of civilization. With the advent of the Europeans, their customs soon become modified, and it often happens that cannibalism disappears, without any intervention on the part of the whites, by mere force of contact.

Barter is carried on with the natives, who are very skillful in trading being full of subterfuges, and lengthy negotiations are necessary to obtain from the merchants the greatest possible amount of value for the very least equivalent.

Agriculture does not flourish, except so far as concerns products absolutely necessary for their daily life; women and slaves alone work on the plantations, the men but very rarely taking a hand in such labors, and only when a great exertion is needed.

Among the blacks employed by traders may be found types of all tribes as far as Cape Lopez, and some few from the interior of the continent.

The strongest and best workers are the "Kroo-boys" (from the coast of Kroo, near Cape Palmas), whence they derive their name. All of these blacks speak some English, and some few of them a little French. They receive from five to seven dollars a month, and board and lodging; they are usually engaged for eighteen months, after which they are paid their wages, either in goods or cash, as they may desire; the majority generally receive about two-thirds in merchandise. Like other black workmen, they are fond of heavy goods of cotton, and of various colors, table and pocket knives, umbrellas, flintlock guns, powder, tafia, gin, pearls, felt and straw hats, jewelry, second-hand military and naval uniforms, razors, soaps, combs.

The Cabindas act as sailors and domestic servants.

The Loangos are joiners, ship and house carpenters, and coopers.

The smiths, masons and brickworkers come from the English colony, on the Gold Coast.

In the employ of the Congo Independent State are also natives of Zanzibar, Haoussa and some from the head-waters of the Niger.

The negroes have no religious belief, but are given to fetishes, of which the chief are the good genius, or the Creator, and the evil one, or the Devil. These are represented by rudely carved idols and adorned with shields and tatters. Additionally each negro carries about his neck or waist small objects of veneration, or talismans.*

* According to a recent traveler, "A curiously-shaped idol, either female or fashioned like a priapus, can still be found at all cross-roads. It is generally a foot in height and stands on a round pedestal raised upon a pole a yard from the ground. In front a flat stone supports a basket, into which passing market people and all who have concluded a bargain make a point of dropping grain or other food, which any starving or destitute person is at liberty to eat."

The same authority states: On the Island of Kimeh, the sacred burial place for ages of the Wabuma chiefs, were many fetishes, "figures of various sizes, all of them equally hideous and obscene." (Bateman.)

THE JOURNEY UP THE CONGO RIVER.

Coming from the high sea, the first land sighted is a low sandy coast, fringed with verdure as a background, later a red clay; here is Point Pedraô. Further is Shark's point, opposite which, on the right bank of the river, lies

BANANA.

This is the first of the settlements of the Congo Independent State passed on going up the Congo river, which, at its mouth, is eleven to twelve kilom. wide. Here is a long range of white "factories," built on piles, and the port is accessible to vessels not drawing more than six metres of water; the rise of the tide is 1M.80. This harbor is claimed to be the best between the Congo river and the Cape of Good Hope. Although pilotage be free, an official service has been organized by the Independent Congo State. Every vessel of more than 500 tons, entering Banana, is to pay a fixed tax of 150 fr., which is intended to cover the State for the expenses incurred by the placing of buoys, the building of lighthouses, etc. On paying this due, ships may receive a pilot of the State to take them in and out the harbor without any extra charge. Up to Boma and return pilotage tax is 300 fr. for four days. For each exceeding day an extra charge of 50 fr. is to be paid. Houses, both for dwelling and store-houses, have been built of brick and wood; a hotel has been erected by the Dutch Co. where travelers are boarded and lodged for seven shillings a day.

The chief commercial houses here are as follows:

1. The Dutch Co., having its home office at Rotterdam; founded in 1869, covers a territory of 700 arpents; employs at Banana thirty whites and 800 blacks; has forty stations along the river.
2. The house of Daumas-Béraud et Cie., of Paris, founded in 1865; employs eight whites and 100 blacks.
3. The Compagnie Portugaise du Zaïre which possesses half a dozen stations on the river.
4. Valle y Azevedo, Lisbon; four whites and thirty blacks.

All these houses own wharves and docks as well as sailing-vessels; the Dutch Co. owns four steamers; the French, and Hatton & Cookson Co. each one; the Congo Independent State, fifteen.

After leaving Banana, the stream narrows to five kilom., and is from 20 to 270 metres deep; the current is about five knots. After an hour Boulambemba point, locally known as *the bottomless pit*, is reached; twenty-two kilom. from Banana the "Scotchman's Head" is passed, and eleven kilom. further on, at Kissanga, are situated the Portuguese factories. A short distance further, on the opposite bank, are the factories of Ponta da Lenha, established on the island of Tehiwangi. Here are found the bamboos used in building in great abundance; they cost from 50 to 75 francs per thousand. Even the very largest vessels can come up to this point, where begin the difficulties of navigation at the "Heron Bank."

From Ponta da Lenha to m'Boma the river contracts and is obstructed by several large islands.

At "Fetish Rock" the Congo storms over reefs and expands to 1500 metres in width.

At m'Boma the river is fifty metres deep, and is 4700 metres in width ; here it is divided by islands into two arms.

m'BOMA

May be considered as the interior port, or, as a Belgian writer has well expressed it, as "the Antwerp of the Congo;" the tide here is only six or seven centimetres. Here is stored all the merchandise sent from Banana to be distributed in the interior, and here come the natives for traffic. It is at present the capital of the State and the centre of the commerce of the Lower Congo. The Dutch, English, French and Portuguese trading houses have large establishments here, employing about thirty whites and 600 blacks. A flourishing mission has been founded here by the Roman Catholic Church. In 1886 the Congo Independent State installed a postal service. It has also erected here an iron pier, well equipped with cranes for loading and unloading cargoes with the greatest facility. The government storehouses are connected with the wharves by a railroad. A Belgian commercial company, "les Magasins Généraux," is now building at m'Boma a huge hotel and spacious storehouses where all articles of consumption may be obtained at reasonable prices.

Passing up the stream, twenty kilom. after leaving m'Boma, the panorama changes, lofty and well-wooded mountains appearing on the right bank, while those on the left are barren and dry. Here terminates the alluvial basin. Above the large island, "Des Princes," the islets have disappeared, and the river shows only a vast expanse of tranquil water, from 500 to 2000 metres wide, whose banks reach sometimes to an elevation of 350 metres. The navigation becomes more difficult, owing to an augmentation in the strength of the current and the more frequent appearance of rock-reefs and rapids.

Seven hours' journey from m'Boma appears Noki, a Portuguese commercial centre and the last that belongs to that nation on the left bank of the Congo. Here is the frontier marked out by the Congress of Berlin ; from this point both banks of the river belong to the Congo Independent State up to Manyanga, where the French possessions begin.

Along the river between m'Boma and Noki are about thirty factories, all substations of houses established at m'Boma.

Passing "Ango-Ango," "Fuka-Fuka" (where there are commercial houses), Underhill (where there is a Protestant mission), Matadi is reached. At this point begins land transportation for goods, etc. From here will start the railway line which is to connect the Lower Congo with Leopoldville, on the Stanley Pool.

Large ocean steamers can come to Matadi without breaking cargo.

At Vivi, which is situated a little beyond Matadi on a plateau ninety-nine metres above the river, the navigation is stopped by the rapids. Further up the river begin the "Livingstone Falls."

TOPOGRAPHY.

The Congo Independent State is divided, topographically, into two regions, the one elevated, which is known as the Upper Congo, the other depressed, the Lower Congo. Between these territories rolls tempestuously the river Congo over thirty-two cataracts and rapids, forming an immense staircase that prevents all navigation for a space of 250 kilometres; it bars access to the most extensive, the most fertile and most healthy portion of the State.

To obviate this obstruction a railway has been planned that will avoid the cataracts and render communication more easy with the Upper Congo.

Lately the fertility and population of the Lower Congo have been called into question, on account of the marshy and desert stretches of country through which the lower river flows, but recent travelers state that this opinion is erroneous; that at a distance of about ten kilometres back from the river-banks there is a dense population, and that the region is fertile and cultivated.

CLIMATE.

The year on the Lower Congo is sharply divided into the hot season, or that of the rains, from the end of October until about the middle of May, and the dry season, from the middle of June to the end of September.

Day and night are of nearly equal length; toward 6 A.M. daybreak begins, and about 6 P.M. the evening twilight sets in, abruptly, without the intervening transitions usual in temperate regions.

The climate of Congo is, in comparison with that of most tropical countries, remarkably cool and agreeable. In the hot season the thermometer is seldom more than from 80° to 86° (Fahrenheit) in the shade, and in the "*cacimbo*," or cool season, it usually ranges from 60° during the night to 75° during the day. During the rainy season the markings are higher, and the humidity with which the atmosphere is filled renders the heat almost suffocating. During the dry season all day a refreshing sea breeze blows, frequently with considerable violence, which is replaced after nightfall by an equally strong one from the land, so the atmosphere undergoes a continual renovation, and a light covering is always desirable during the hours of darkness. The light rains occur in the lower country in October, succeeded by the great rains, with violent thunder storms.

Sooner or later the foreigner must pay his tribute to the climate in the shape of a spell of fever, although it can be readily checked by quinine before and after the attack. Careful and nutritious living, together with the avoidance of unnecessary exposure to the torrid heats of midday, and the heavy dews of night, are the best sanitary precautions. Spirits should be avoided.

The European regains by his appetite the strength that he loses by excessive perspiration ; nothing but the extremest cleanliness can remove the epidermis that decays and replaces itself with enormous rapidity in this hot climate.* Continual baths and the wearing of proper clothing that will readily permit perspiration to take place with the utmost facility are indispensable.

RESOURCES OF THE CONGO INDEPENDENT STATE.

A. Mineral.

1. In the chain of mountains, towards the region of the cataracts, called, by the Portuguese, "*La Montagne de Cristal*," are found handsome pink and gray granite, red and rose-colored marbles, and especially remarkable white marble, beautifully veined with green. The quarries are easy to work, being in an easily accessible region, and close to the river.

2. Granites of all kinds are plentiful in the various parts of the Lower Congo, and the various limestones, necessary for building, etc., abound just where their presence is most desirable.

3. Two rich deposits of copper near the Congo, and indications of others pointing to a well-developed copper region, were found by Mr. Dupont whilst hunting for a reported deposit of malachite in the French Congo territory, to the north of the Valley of the Congo, in the province of Kwilu. These carbonates of copper contain usually from sixty to seventy per cent of pure copper.

4. Titaniferous sands were found, but no other indications of gold. Iron shows in abundance.

5. Iron, tin, lead and sulphur show in abundance.

B. Agricultural.

Whilst the Lower Congo is marked by rocks and arid plains, the traveler is struck, when ascending the river, by the vivid aspect of the luxuriant trees, herbage and vegetation in general, and the wide plains whose agricultural fertility and values seem enormous. A deep, black soil is found, of considerable extent, whose cultivation has resulted in large returns. The deforesting of some parts of the Congo was studied by Mr. Dupont, who is of the opinion that, by a judicious use of the rivers between the Stanley Pool and the Congo, all the devastations and ravages can be repaired, and the best results ensue.

Manioc is abundantly cultivated. 20,000 kilos. to the hectare result in six months, even with a *vicious* system of cultivation.

Palm nuts are found in profusion, in bunches that often number 500 to the cluster. A palm-tree will bear annually a score of such clus-

* The writers who growl at the supposed impoverishing nature of the food attainable in Central Africa are thus characterized by Bateman : "*Their only ground of plausible excuse being the impossibility of glutting themselves with vulgar masses of British beef, stodgy potatoes, and bile-creating beer.*"

ters, representing in the markets of Europe a value of from twenty-five to thirty francs. The production is 24,000,000 kilos., and can be indefinitely increased. The oil is expressed and barreled in casks of 500 litres capacity, in which form it is transmitted to Europe. The fruit is eatable, and, when cooked, tastes like the *scorzonera*; raw, it makes a very good salad. From the fibres of the palm are woven dress-stuffs, mats, hats, baskets, nets, etc.

The *arachid* is a species of ground nut, largely cultivated by the natives, and used in the preparation of culinary delicacies. A fine oil is expressed from it, which, in commerce, passes for olive-oil. At present the almond-palm, palm-oil and arachid constitute seventy-five per cent of the exports of the Congo.

Caout-chouc is very abundant. The gum is brought by the natives in black or white balls, the former looking like Perigord truffles; the latter, however, are the more esteemed. It grows luxuriantly and spontaneously.

Trees; the *Baobab* is found on the coast from Ponta da Lenha, and reaches colossal proportions, often measuring about twenty-two metres in circumference. One at Landana can scarcely be encompassed by seventeen persons forming a circle around with outstretched arms, hand in hand.

The *Kolla* is a lofty tree, of frequent occurrence; it bears a rounded fruit the size of a small melon, from which caffeine is extracted.

Colored woods abound, red, brown, yellow, all susceptible of easy manipulation; the *tavoula* (a red wood) is especially in demand; at least a dozen tons of woods are annually exported from Banana (1886).

The Cottonwood tree often attains a height of over 200 feet; the Kusu-Kusu, the Redwood, the Camwood, the Teak, Acacia, Ebony, Arborvitæ, Saffu, abound.

Fruit Trees: banana, mango (each of which latter trees furnishes, yearly, 400 kilos. of fruit, from which an alcoholic beverage of very fine quality is extracted), the papayer, the maracouja, the lemon, mèagang (or yellow grape), pineapple, exist in enormous profusion.

Copal exists in quantities as yet undetermined.

Cotton grows wild in the Lower Congo, and all the conditions favorable to its fullest development exist. The specimens already obtained are said to warrant the belief that it can equal the usual American article.

Tobacco is cultivated throughout all Africa, but of varying qualities. It has a good taste and an exquisite aroma.

Pepper (called by the natives, pépé or pili-pili) is abundant; its fruit is red: it is both large and small.

Sugar Cane has only once been cultivated, and the experiments are not complete; abandoned in one place, in 1886 plantations have been formed in another on a very large scale.

Vegetables. The onion, alone, of all European vegetables, does not seem to thrive; salads, radishes, peas, carrots, turnips, string beans, cabbage, parsley, tomatoes, cucumbers, celery, potatoes, all grow well.

Cuttings and slips from Madeira vines have been planted with great promise.

Maize, coffee, sesame, orchal and sorghum grow plentifully.

The inhabitants are willing to work, and both male and female are to be seen in the fields.

Animals.

Elephants are seldom seen unless a famine drives them towards lower feeding grounds. They are, however, sometimes found. Ivory is an important product exported to the London market. The buffalo, leopard, antelope, wild cat, wild boar, goat and dog abound. The hippopotamus and rhinoceros multiply in the Congo and its affluents; myriads of apes people the forests. The eagle, the hawk and the vulture are the chief birds of prey, and the duck, goose, pigeon, chicken, the turtle dove, the bengalee, the grallœ, the cardinal, green parrakeet and gray parrakeet with red tail, and kingfisher are found plentifully.

Snakes of the python variety exist in vast numbers.

Cattle.

Fine herds of cattle are grazing on the Island of Matebba, situated half way between Ponta da Lenha and Boma, where M. de Roubaix of Antwerp has an important farming enterprise. Several hundreds of heads of cattle are kept also by the State at Boma for the consumption of its numerous "personnel." Private commercial houses, as Mess. Valle y Azevado, possess large quantities of live stock.

In 1888 commercial value of goods handled at the Congo Independent State was 14,000,000 francs, of which 7,500,000 was exports.

ARTICLES OF IMPORTATION.

In exchange for ivory, palm nuts, palm oil, arachides, caout-chouc, dye-woods, copal, etc., brought by caravans to the various factories, the natives receive flintlock and percussion guns, flints, powder, cotton goods, rum, pearls, copper rings, table and pocket knives, old clothes, straw and felt hats, cotton and flannel shirts, glass and pottery ware, umbrellas, wooden and iron coffers, locks, chains, tin forks, tin cups, big and little bells, razors, scissors, combs, perfumery, soaps, mirrors, needles, pins and thread, buttons, white ribbands, gardening tools, matches, clay pipes, bracelets, ear and finger rings, copper bands for arms and legs, musical boxes and accordeons, etc., etc.

COMMUNICATION WITH EUROPE.

1. A monthly line from Liverpool (The African Steam Navigation Co.), taking about forty to fifty days; fare, 700 to 800 francs.

2. The Woerman Line, from Hamburg, at the end of every month. Time, forty-five to fifty days; fare, 750 francs.

3. L'Empreza National, from Lisbon, on the sixth of the month ; twenty-two days ; 750 francs.
4. Nieuwe Afrik. Handels-Vennootschap, Rotterdam, five times a year ; twenty-one to twenty-two days.
5. Hatton, Cookson and Co.'s steamers, from Liverpool.

RAILROAD, &c., IN THE CONGO INDEPENDENT STATE.

As above stated, a railroad is to go from Matadi to Noolo, near Leopoldville, on Stanley-Pool, for which the survey, employing fourteen engineers for sixteen months, has just been completed and estimates prepared. Its cost has been estimated at 25 millions of francs, including purchase of rolling stock and miscellaneous expenses in Europe and Africa, and is considered sufficient to pay besides the expenses an interest of 7% during the four years that are deemed necessary for the laying of the road.

The length of the line will be 436 kilometres, of which only the first twenty-six present any engineering difficulties, while the remainder of the line "will be laid under exceptionally easy circumstances." It will have a rail gauge of 75 centimetres, with steel rails weighing 23 kilos., steel sleepers at equal distances of 80 centimetres and weighing 23 kilos., the whole of the line weighing 75 tons per kilometre.

The neighborhood through which the line is to pass abounds with ample materials for ballast, and firm soil is found for the abutments of bridges very near to the surface of the ground.

Matadi, the starting point of the railway on the Lower Congo, is a place easily accessible to sea-going vessels, and where they can discharge their cargoes directly into the freight cars ; Noolo, the terminus at Stanley-Pool, is a short distance above Kinchassa and 3 miles from Leopoldville, well above all the rapids that obstruct and hinder navigation in the region of the Cataracts. From this point light draught vessels can ascend the Congo and its affluents for an uninterrupted distance of eleven thousand five hundred kilometres. Large docks can be advantageously built at Noolo. Between these two first-class stations an intermediate one will be placed at Kimpésé, where travelers will spend the evening, as it is not intended to run any trains during the night, and the distance is too great to be traversed within one day. Stations will also be established at Loufou, Inkessi, and Ntampa, thus dividing the whole distance between the Lower Congo and Stanley-Pool into five sections of an average length of 85 kilometres each.

The journey that now requires a whole month for its accomplishment, entailing delay and often damage, could then be made within two days, and the expense of freightage greatly reduced, enabling goods to be delivered in Europe at a much greater profit.

The navigable waters of the Upper Congo are 6000 kilos. Steamers

can go from Leopoldville almost to the Soudan, by the "Oubangi-Ouelle."

POLITICAL, JUDICIAL AND ADMINISTRATIVE ORGANIZATION.

The King is the absolute monarch, ruling without any check to or division of his power.

A decree of King Leopold, dated October 30, 1885, organized the Congo Independent State into three departments, *viz.*: Foreign Affairs (to which is entrusted that of Justice), Finance and the Interior. An Administrator-General, named by the sovereign, presides over each of these departments, who deliberate together over the affairs of the State, and submit the results of their councils to the King for his approbation. The departments have jurisdiction as follows :

A. Foreign Affairs, which includes commerce, post-office, justice, legislation, religion, etc., etc.

B. Finances :

(a.) All manner of taxes, duties and imposts ; all regulations of territory.

(b.) The general department of accounts and all matters relating to the operations of the treasury.

(c.) The monetary system.

C. Department of the Interior :

Public instruction, police, hygiene, transportation in all its phases, public roads, public armaments, etc., etc.,

The Governor-General of Congo rules under the directions of this Central Council, assisted by an Inspector of State, a Secretary-General, and many subordinate local assistants.

The territory is divided into eleven districts, administered by a Commission, with one or more adjuncts. The districts are Banana, Boma, Matadi, Cataracts, Stanley-Pool, Kassai, Equator, Ubangi-Uellé, Aruwimi-Uellé, Stanley Falls and Luluaba.

LAW DEPARTMENT.

Justice is administered by a tribunal of the first instance, and one of appeal.

The Appellate Court has its permanent seat at Boma ; the lower Court, whose place is at Banana, may travel within its district, the Lower Congo, up to Vivi and Matadi.

Other tribunals have been erected at Leopoldville and Lukungu.

The death penalty is abolished, except in the case of cold-blooded, deliberate murder, and voluntary homicide is punished by imprisonment for life.

THE CIVIL STATE.

There are offices at Banana, Boma and Leopoldville, where are registered the births, deaths and marriages occurring among the European population. Marriage must be preauthorized by the Governor-General, and the ceremony performed by an official to be designated by him. The rights and duties arising from matrimony are governed by the laws of Belgium. Arrivals, departures and changes of domicile are registered at Banana and Boma.

LAND-HOLDINGS.

When, in July, 1885, the sovereignty of the Independent State was proclaimed at Banana, at the same time a decree was published that no one should attempt to dispossess the natives from any of their lands, and that further, no territorial contract with them should be valid unless made through an authorized agent.

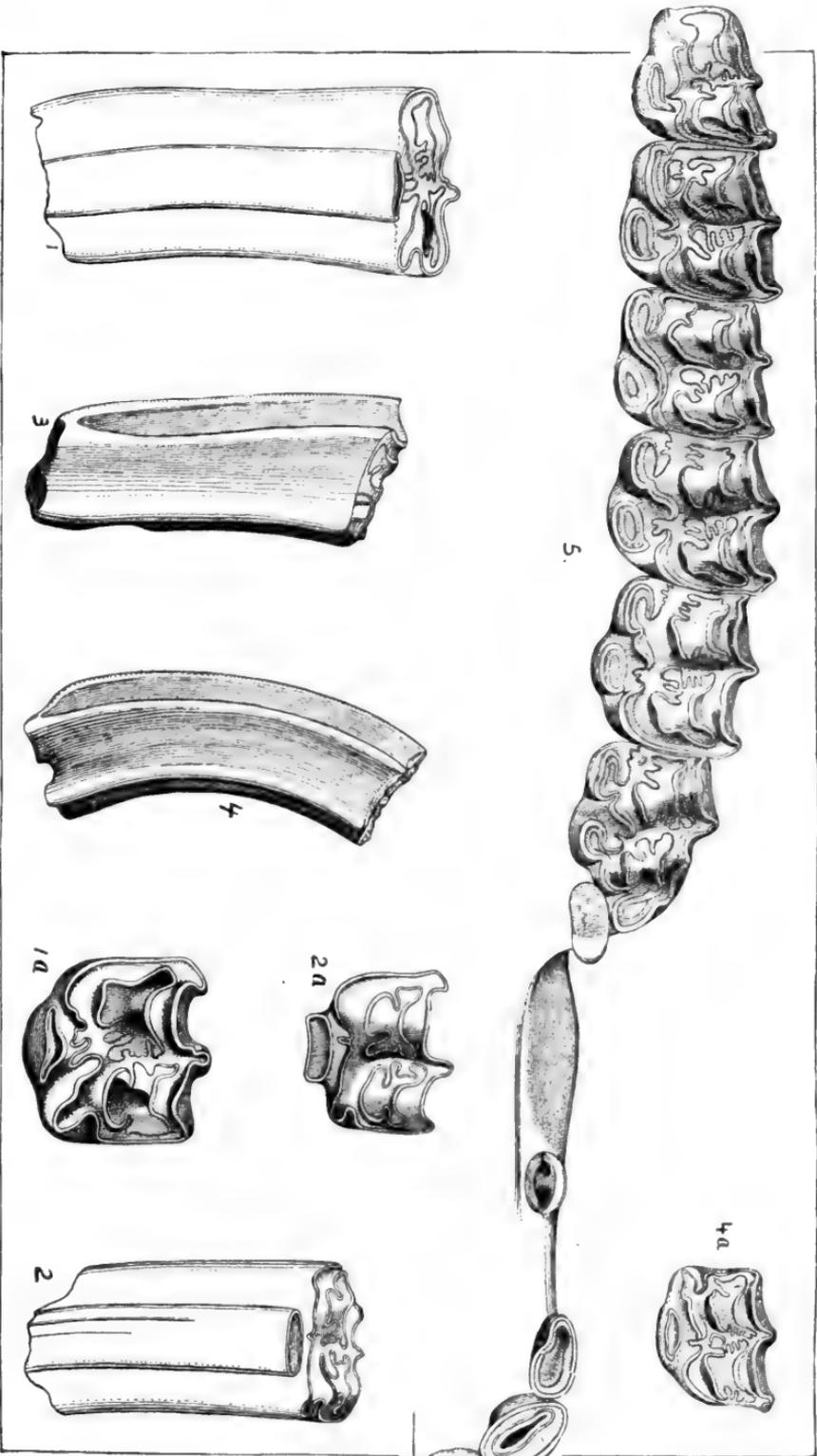
On August 22, 1885, another decree invited all foreign-born inhabitants, who claimed land-rights in the dominion of the Congo Independent State, to declare them before the proper official conservator of titles, so that they could be entered in the registry, and the State could create and confirm a valid and legal title to each proprietor. By this measure considerable confusion and litigation were put an end to, for the blacks had often sold the same property several times over to a different purchaser.

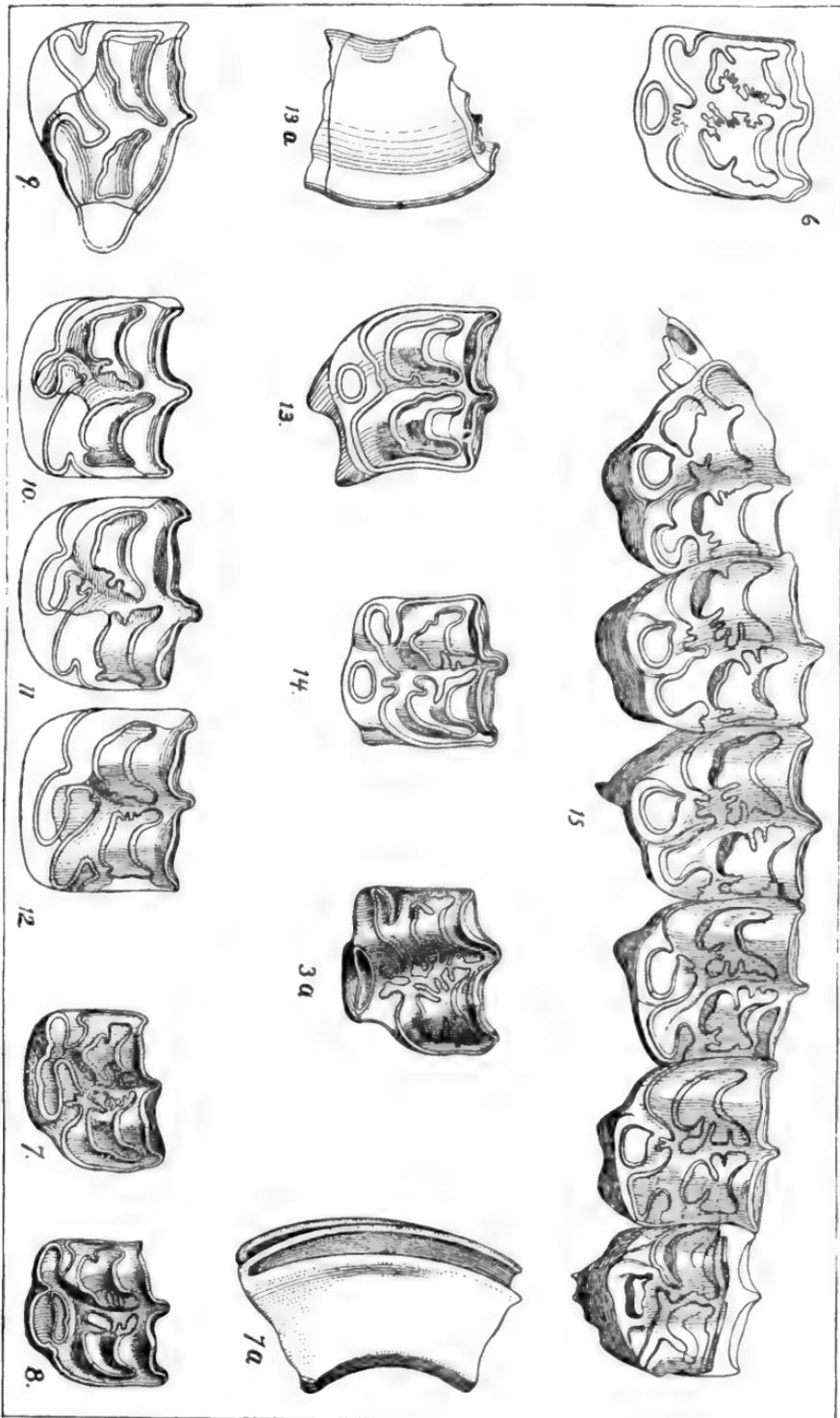
A system, analogous to the "American Land Patent System," was created, and an alienation was to be accomplished, by registry at a record office, the fee for which was twenty-five francs at each enrollment.

For the purposes of sale the State divided all lands into two classes: 1. Those belonging to the aborigines, and unoccupied lands. 2. Those the property of the State itself. Any and all transfers of land in the first category must imperatively receive the approval of the Governor-General before they could be held valid. The lands of the second division were sold only upon spontaneous demand, the contracts being signed by "The Conservator of Titles," and approved of by the Governor-General. If the property in question exceed 100 hectares, or embrace 200 mètres of riparian rights, the contract of sale must first be sent to Bruxelles for the approbation of the central government.

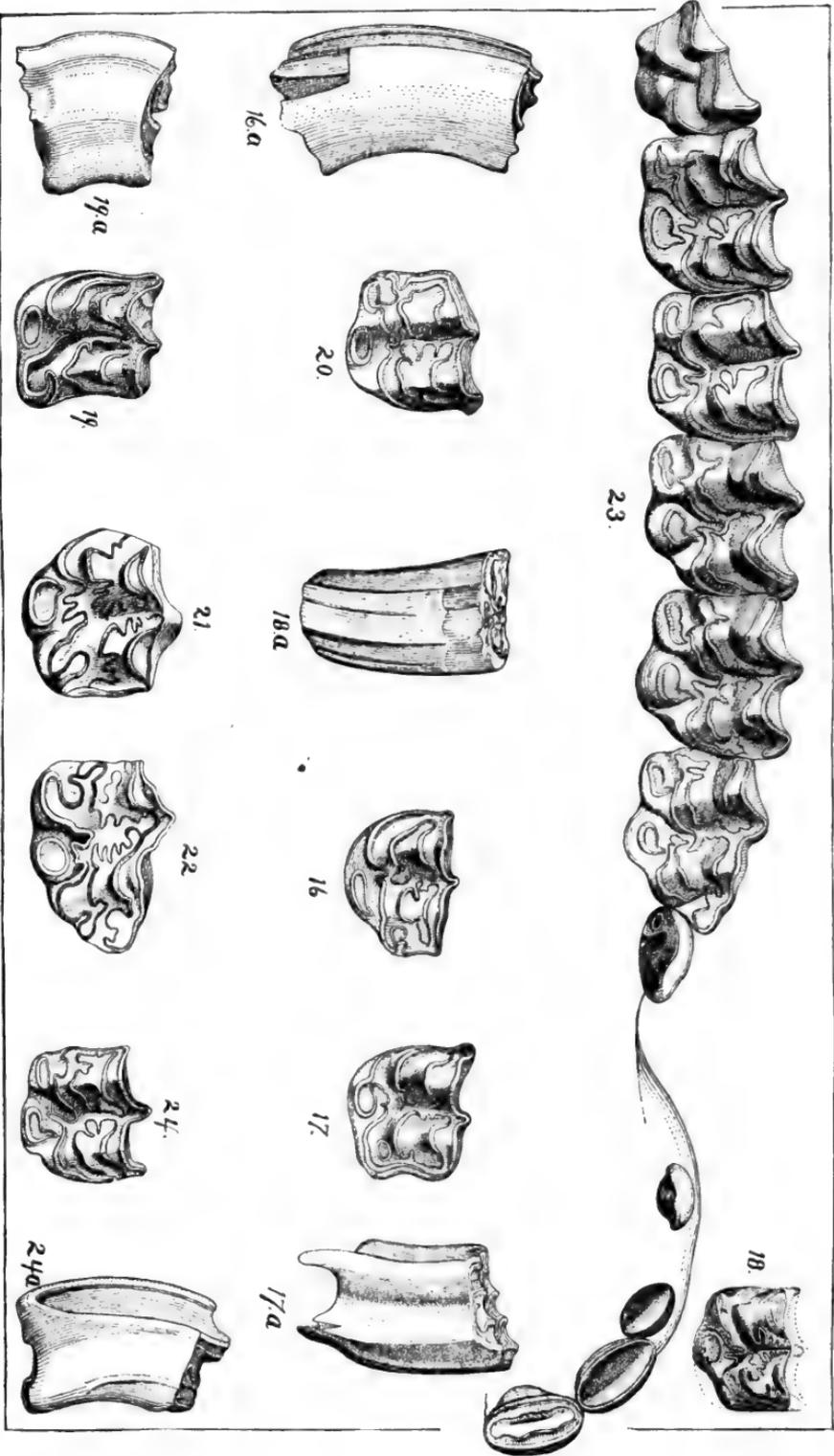
These regulations are only carried out strictly in reference to the Lower Congo region; on the Upper Congo the acquisition of territory by Europeans is to be encouraged, and they are to be permitted, without pre-authorization, to acquire any unoccupied land not exceeding ten hectares, and not extending more than 200 mètres along the Congo or other navigable water-course, always providing this can be done peaceably and without detriment to other rights. To occupy more land than the amount above given the consent of the government must be obtained. So well was the project carried out that, in less than three years from the date of

HYPOTHERIUM









HIPPOTHENIUM.

the proclamation by the State, the registration of every non-indigenous land-holder was completed, not without much arduous labor.

Matters relating to mines and forests are under the control of the same department that regulates lands. Except on one's own legally registered property no trees nor plantations can be cut or damaged, unless with the consent of the Governor-General or one of his authorized deputies, previously and specially obtained. No mines can be worked without a license from the sovereign, and the sale and transfer of lands by the State does not confer any mineral rights.

RELIGIOUS MISSIONS.

By the sixth article of the Berlin Conference, all the signatory powers engaged to watch over the preservation of the indigenous populations of that region and to ameliorate their moral and material conditions of existence, and guaranteed an especial protection to missionaries, savants and explorers. Liberty of conscience and religious toleration were expressly guaranteed both to the natives and to European settlers without any restriction whatever.

The care of the missionaries is an astute idea; they are always the precursors of civilization, undergoing hardships, in their spiritual zeal, from which oftentimes men shrink who have no loftier motive than love of wealth. Every mission founded is a central source from whence the influence of white culture sheds, beacon-like, a far-reaching influence among the less famed nations of the world and becomes one more step towards their peaceable conquest by civilization. By them the points of contact are increased, and through them relations of the most friendly character are established and maintained. To their schools resort the young barbarians, desirous of becoming acquainted with the wonder-working arts of the European, and they return not only with a knowledge of rudimentary education, but also with ideas as to how to obtain the most profit from their badly tilled fields, and once again the lamp of science is handed on yet one step further in its dissemination.

The missionaries of Christendom are the barrier to the progress of Islam in the dark continent, an influence that can hardly be overestimated. "Wherever Islam penetrates," writes Dr. Nachtigall, "slavery is installed, and to demolish the traffic in human beings, it is necessary to strike at its source, in Islam."

No traces are to be found of the good results formerly accomplished by the labors of the zealous workers of the sixteenth and seventeenth centuries; indeed, by the eighteenth century, the indigenous races had totally relapsed into a brutal and beastly idolatry. A few isolated attempts were made to remove this sad state of affairs, but without great success. When, in 1885, the Congo Independent State was founded, two missions were existing on the Congo; the *Pères du Saint-Esprit* were installed at Boma and some Protestant missionaries were at Stanley pool.

At present *La Congrégation de Scheutveld*, that has attained a remarkable success in Asia, has taken the evangelization of the Congo under its charge, and the Holy Father, in a late brief by which a vicariat was created, has confided to them the noble project. A mission has been established at the junction of the Kassai and the Congo, where schools have been established, not only for spiritual and scientific instruction, but also where the knowledge of manual labor of all kinds is imparted.

Flourishing Roman Catholic missions exist at Banana and at Boma; the Protestants are along the river as far as the Station of the Equator; some religious establishments of the *Pères d'Alger* are on the west bank of Lake *Tanganyika*.

On December 31, 1888, a society was founded under the title of "L' Association Congolaise et Africaine de la Croix Rouge," whose object was to render service to the sick and wounded in time of war, and at all times to give aid and assistance throughout the extent of Africa to all who, in the interests of civilization in Africa, have become ill or injured, as well as to those of the natives who might be suffering. The Society will be represented in the Congo by the Governor-General.

FINANCES.

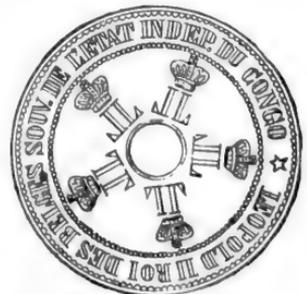
The monetary system is based upon a gold standard. The currency



5 Centimes.



1 Centime.



10 Centimes.



consists of francs and centimes; the franc representing the 3100th part of a kilogramme of gold nine-tenths ($\frac{9}{10}$) fine.

The gold coinage consists of twenty-franc pieces ; the silver of 5, 2, 1 and $\frac{1}{2}$ franc ; copper, 10, 5, 2 and 1 centime.*

The gold and silver coins are manufactured in conformity with the regulations of the Latin Monetary Union, and are the finest specimens of coinage of the present generation.

PUBLIC DEBT.

By edict of February 7, 1888, the public debt is to be 150,000,000 francs, divided into 1,500,000 obligations of 100 francs each, in 60,000 series of twenty-five each, bearing interest at five per cent.

The debt has ninety-nine years to run, and six times a year a certain number of bonds are redeemed.

In the first eight years premiums are drawn for 1,000,000 of francs ; in the second for 700,000 ; and in the next for 512,000 francs. In the last seventy-five years the drawings will amount to 270,000 francs.

A sinking fund is created for the redemption of the debt as it becomes due.

On February 14, 1888, 10,000,000 francs were issued, in bonds of 100 francs each. On the 7th of May last (1889), a second issue of 60,000,000 francs of the same bonds has taken place.

The annual revenue derived from the State was (in 1886) 1,700,000 francs, which more than defrayed all expenses.

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* The writer has deposited in the U. S. National Museum, Washington, D. C., a complete series of the silver and copper coinage.

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Some Thoughts on the Sun and Cross Symbols.

By Richard Vaux.

(Read before the American Philosophical Society, May 17, 1889.)

Symbols were the characters of original language. The alphabets of all written languages are composed of signs.

To express a thought, a form was necessary. To think was a human faculty. It marked man as the highest type of created beings. A thought was the result of an impression on the mind, made from a sense, or by sensation, through some object, or a consequent correlative emanation.

To find a form that would embody the mind's impression was solved in a sign, or symbol. The mental, or reasoning process, by which this result was reached is not possible of explanation. We know that the senses conveyed to the mind a cognizable impression, and then the mind operated. This process is called reasoning.

The sign was made to represent an impression on the consciousness. This sign, or symbol, is either the impression produced by natural objects, or it is an expression of a revelation, crystallized on that impression.

It is believed that the primitive types of the white race, as far as is now known, had a sign language.

The need of a form of expression was inherent, implanted in man at the creation. To communicate or impart the thought was as essential as to live. The form of such expression was the actual primary exclusive mode adopted by force of a like necessity. The symbol was the only possible form. If the symbol was the interpretation of the comprehension of the natural object, that was the revelation taking form, and the symbol formulated the revelation. If the symbol was accepted as presented, and interpreted by others, it strengthens the contention of a revelation to those who presented it. The origin of the symbol and its diffusion among other peoples who adopted it, proves that the revelation was a supernatural endowment of the human race. If the symbol expressed a mental impression which existed consciously, its form reflected what was inherent in the mind. If that symbol was found among different peoples, and expressed among all who originated, or adopted it as the same inherent expression, it became a language. A tribe on a continent, and one on another, using the same symbols, may give force to the suggestion that they were received by intercommunication, but the psychological condition of each must have been equivalent to produce the symbol, and the adoption of it under the same or a similar interpretation.

The important question remains as to the derivation of the activity and receptivity of the consciousness of these peoples.

Their physical conditions may have been alike; the natural surroundings somewhat similar; but they do not account for their inherent equivalent consciousness, unless it comes from a superhuman revelation.

As far as we know, there never has been an *invented* symbol.

Revelation begins in the thought, or in the adaptation of the symbol as a measure of the revelation anterior or posterior to its adoption.

As growth strengthened, the mental powers felt its influence, and consciousness, and the receptive faculties became sensitive. The ability to compare different conditions led to conclusions, and this was the demonstration of the reasoning faculty. Natural objects, the observation of natural changes, became subjects for thought.

The comprehension was stimulated by these observations. The nutritive and sensitive, which were material conditions, gave place to the rational, which was spiritual. The mind began to appreciate that a cause existed. That it was not of human origin was evident. Then, it must be supernatural. The cause, whatever it might be, was beyond the range of man's power, or knowledge. It was not an accident possible to human mental acquirement. The sun rose, and set. Man could not control, order, or decree its positions. Some supernatural power was the cause. Then, the sun was a supernatural existing power. To decide what it was exhausted the capabilities of the mind of man. The comprehension of the fact left no alternative but to call it a God. This was a spiritual revelation. The mental and the spiritual comprehension were in accord.

The sun was that supernatural power which was accepted as governing man. The circle became the symbol. These were revelations. Man was created ; the sun was created.

These facts are undeniable. Sun worship is a fact associated with the primal condition of the existence of primitive man.

Science must accept these facts, however it may deal with them. It is also a fact that various peoples, in the earliest of days, accepted the sun as a supernatural manifestation, and the circle was its symbol. If philosophy is the love of wisdom, or the explanation of the reason of things, yet it cannot demonstrate why the sun was first worshiped. Therefore, the truest explanation is that this natural object, impressing the mind of the beholder, drew out of the inherent spiritual consciousness the only thought possible, a revelation of a Creator, superhuman, self-existing, with power and majesty.

With all our philosophic knowledge, it must be admitted that this explanation is so natural as to be neither a speculative, nor a mythical theory.

To give authoritative force to this explanation, the universality of sun worship in the earliest days must be shown. From the best authorities, sun worship may be said "*to have been universal among nations the most remote from each other, from the Torrid to the Frigid Zone. It spread over America, as it did over Europe, Africa and Asia.*"

"*All ancient religions when analyzed prove to be only forms of solar worship.*"

"*Thus we find the early nations of all parts of the world claiming a solar origin.*"

From the same authorities, it may be said that this is true of the Scandinavians, Egyptians, Phœnicians, Assyrians, Indians, Greeks, Romans, Mexicans, Peruvians, Persians, Medians and Arabs.

Yet it is to be observed : "*That contests between the spiritual and material nature of man are found in the earliest antiquity.*"

"*In Europe and Asia the people had a simple faith in the powers of nature, the most notable of which was that Great Luminary, the Sun, which throughout all ages, and amongst nations, under one name or another, has been universally the object of adoration.*"

"*We search into emblems with a different intention to that which we inquire into ordinary language. The last tells us of the relationship of nations upon earth ; the first of the probable connections of man with Heaven. Letters and words mark the ordinary current of man's thoughts, while religious symbols mark the nature of his religious aspirations.*"

How the universality of this worship came to pass cannot be accounted for by the intercommunication of peoples. It therefore, with confidence, is pointed out, that it is a revelation.

This revelation is the outcome of the primal inherent consciousness of man, under the influence of the material and nutritive, sensitive and rational elements of his being.

It is pointed out that the sun symbol is as universal as sun worship. It is the same symbol among peoples. The circle with rays, and with a centre point, is the expression of both the natural and spiritual consciousness. As Divine, Superhuman, a Creator, the Origin of Life, the symbol took the form of the sun itself, and the primitive man was taught by a revelation, the theology to which the symbol was dedicated. What more reasonable than that the figure of the sun should be the figure of the worship? Whatever may have been added to this symbol in after-time by the ingenuity of scientific hypotheticism, the fact remains that the sun symbol originated in the revealed conception of a purely religious significant truth.

We think this is the consensus of authoritative opinion of many students and scholars. To cite them is to catalogue the exegetical treatises from Moses to Mühler. It is at least permissible to add that the sign on the cloud and the darkness at Calvary were symbolic evidence of a supernatural revelation.

One more example compels notice.

THE CROSS.

Christianity may be called the equator that divides the ante- and post-Christian eras. In both, the Cross has been a religious symbol. In the very earliest religious systems there was a more or less imperfect recognition of one Supreme Being, the origin of created beings, even the gods themselves. This is found among the Scandinavians, the Hindoos, the Teutonic and Aryan races. The Great Spirit was recognized among all the Indian tribes. The circle with the central point is one of the earliest symbols of the Great Spirit from which the Hindoos taught all things proceeded.

The date of the origin of this symbol is not known. It may have been prior to the interlaced triangles of the Hindoos. Its history, however, shows that from the beginning it was exclusively of religious import. With the sun worship, it was universal among primitive peoples. It was a symbol, and it is said it is never found except to express some religious idea.

“When we see the same ideas promulgated as Divine truth on the ancient banks of the Ganges, and the modern shores of the Mediterranean, we are constrained to admit they have something common in their source. They may be the result of celestial revelation, or they may alike emanate from human ingenuity. Religious symbols mark the nature of man’s religious aspirations.”

When the Cross became a symbol cannot be determined. It can successfully be asserted that among primitive peoples it held a conspicuous place, with a spiritual and mystic significance.

The Circle symbol identified with sun worship, crossed, added to its sacred character. In very remote antiquity, many centuries before our era, the crossed Circle was a religious symbol.

Prehistoric and pagan traditions show that in man a spiritual consciousness existed.

Aristotle, in his subdivision of the Nutrient, the Sensitive, and the Intelligent or Rational, as indicating the growth from the material to the spiritual, portrays the highest form of this growth to be religious thought. It may be from the different effects of the senses and sensations arising out of the four causes,—the body, represented by the material; the soul, comprising the formal; movent, or efficient, and the final, or spiritual.

This philosophy of growth is the explanation of the relation between what is the mental, moral, and physical trinity in our nature. In the earliest days in the life of man this spiritual faculty existed. The fact that symbols were then known, and that they emanated from this spiritual faculty, sustains the contention that a religion was a revelation to every people, and that under some form a supernatural Divine Power was worshipped. The Circle symbol of the Sun God, to which a cross was added, must be regarded as significant of the primitive principle of this worship. A Cross appears among all the peoples of whom any knowledge is obtainable from traditions.

The Crux Ansata, or the Cross of Horus, or Tau, fifteen centuries before our era, the Cross Cramponne, the Thor's Hammer, Fylfot, Croix Patte, the Swastika, the Maltese Cross, the Handled Cross, are associated with worship as a symbol. The hieroglyphics in the Temple of Serapis indicate that the Cross there is interpreted, "Life to come." The Maltese Cross was found in the ruins of Nineveh, another in the Hall of Nisroch. The Handled Cross was a sacred symbol among the Babylonians.

The authorities consulted justify the contention that the Cross in its various forms was a spiritual symbol of religion. In Europe a people is reported to have lived more than fifteen hundred years before our era, of whom nothing is now known. Quarries are found, called *terramares*, on the site of the locality of these people, and the researches in these quarries showed that the Cross was a religious symbol among them. The tombs of Golasecca show the fact that one thousand years before our era the Cross was a like symbol. In a ruined city in South America, not inhabited at the time of the conquest, a palace has been discovered, and in it a slab of gypsum on which a sculptured Cross was found. And also another colossal Cross represents on it a bleeding deity, with a Tau Cross, surrounded by figures. The city existed nine hundred years before our era. The palace in Palenque was 128 feet long, 180 wide, and 40 high, in which are temples, chapels and altars. The same Cross is found in pre-Mexican writings, as in the Dresden Codex.

In Mexico, Paraguay, Peru, among the Maya race in Central America, and the Aztecs, Quinamies, Zapatecas, and the inhabitants of the ruined cities of Zaputero and St. Ulloa, the Cross was venerated as a sacred symbol.

It has been said by high authority, that :

“The widely spread mystic purport of the Cross Symbol has long been a matter of comment. Undoubtedly, in many parts of America, the natives regarded it with reverence anterior to the arrival of Europeans; in the old world it was long a sacred symbol before it became the distinctive Emblem of Christianity.”

It is pointed out that during the historic period, till our era, no evidence asserts a denial of this fact. All the mythologies, Scandinavian, Egyptian, Assyrian, Greek and Roman, the tombs, temples, obelisks and pyramids contain cumulative evidence of this characteristic of these symbols. Some of the esoteric symbolisms of these mythologies permeate the teachings imparted to-day to five hundred thousand men in the United States. It is also contended that out of the spiritual consciousness of all peoples came a religion as a fact. That it was a revelation is as well worthy of credence as that it originated in the ingenuity of material speculation. As before suggested, the use to which these symbols may have been applied, and with which theories and scientific hypothetical inventions have in late times sought to associate them, fails, nevertheless, to destroy their original character. The Phallic theory has no claim on science or philosophy. It portrays the sensuous and the erotic. The scientific effort to divert the primary relations of these symbols from the assertion of the spiritual consciousness of man is ingenious and attractive, but its force is in the weakness manifested to make this effort successful.

It is most reasonable that with the very limited knowledge of primitive man, natural objects were looked upon as the exclusive causation of sensations. Perceptions and impressions were thus derived. The consciousness accepted the object as the material, and the formal, movent or efficient, and final were spiritual

The spiritual consciousness absorbed this impression of the nutritive and sensitive consciousness. It then came to pass that the Sun, the Serpent, and the Tree became symbols of worship, as the natural consequences of a revelation of a spiritual aspiration, and the worship of these symbols is therefore the test of a Divine revelation as the only possible explanation.

The conclusion that synthetically follows this line of thought on the facts given, from authorities alike credible and acknowledged, is that symbols expressed the sensitive and spiritual conscious impressions and aspirations of people since the creation of man. These symbols were the concrete revelations of a Deity to the human race as a Superhuman Divine Power.

Science, a superrarified philosophy, and modern speculation cannot divest them of their primary character. Revelation imparted to man this primal purpose and significance of these symbols. They rest neither on speculative assertion nor ingenious assumption; but were rather the emanation of a Divine ever-existing power.

Stated Meeting, September 6, 1889.

Present, 2 members.

Dr. HORN in the Chair.

Correspondence was submitted as follows: Letters accepting membership from Andrew A. Blair (May 21, 1889), Henry D. Gregory (May 20, 1889), Philadelphia; Lester F. Ward (June 1, 1889), Washington, D. C.; Paul Hunfalvy (May 10, 1889), Buda-Pesth.

Circular from Royal Society, New South Wales, announcing premiums for 1889, 1890 and 1891.

Circular from Gen. C. W. Darling, Utica, N. Y., in reference to a projected work on "The more Important Versions of the Bible."

Circular from Dr. R. H. Lamborn, New York City, N. Y., in reference to the destruction of mosquitoes and houseflies by artificial propagation of the dragon fly.

Circular from Rothery, Davis & Co., Philadelphia, offering for sale a collection of antique pottery.

Letter from Prof. Steiner, Darmstadt, in reference to Pasilen-gua and the proposed Congress to be called by the American Philosophical Society.

A letter from the Anthropological Society, Washington, requesting exchanges, which was so ordered.

A letter from the President of the Society reporting the appointment of Dr. Hays to prepare the obituary notice of Dr. Gross, and enclosing his acceptance of the same.

A letter from Mr. Robert Patterson in reference to the obituary notice of Franklin Peale, read by himself before the Society, December 16, 1870 (Proceedings, xi, 597).

Letters of envoy were received from the Institut Egyptien, Cairo, Egypt; Mining Department, Melbourne, Victoria; Royal Society of New South Wales, Sydney, N. S. W.; Survey of India, Calcutta, India; Observatoire Physique Central, St. Petersburg, Russia; Naturforschende Verein, Brünn,

Austria ; K. B. Gesellschaft der Wissenschaften, Prag, Bohemia ; K. P. Meteorologische Institut, Berlin, Prussia ; Verein für Chemnitzer Geschichte, Chemnitz, Saxony ; K. Leopoldinisch-Carolinische Akademie, Halle a. S., Prussia ; Vogtländische Alterthumsforschende Verein, Hohenleuben, Saxony ; Physikalisch-Medicinische Societät, Erlangen, Bavaria ; K. Sächsische Gesellschaft der Wissenschaften, Leipzig, Saxony ; Gesellschaft zur Beförderung der Gesammten Naturwissenschaften, Marburg, Prussia ; Société de Physique et d'Histoire Naturelle, Geneva, Switzerland ; Académie R. des Sciences, Amsterdam, Netherlands ; Fondation de P. Teyler van der Hulst, Harlem, Holland ; Académie Royale des Sciences, etc., de Belgique, Bruxelles, Belgique ; Musée Guimet, Ecole Polytechnique, Paris, France ; Royal Statistical Society, Meteorological Office, London, Eng. ; Radcliffe Observatory, Oxford, Eng. ; Museum of Comparative Zoölogy, Cambridge, Mass. ; Prof. Edward North, Clinton, N. Y. ; Observatorio Nacional Argentino, Cordoba, S. A.

Letters of acknowledgment were received from the New Zealand Institute, Wellington, N. Zeal. (128) ; South African Philosophical Society, Cape Town (126, 127) ; Imperial Academy, Physical Central Observatory, Prof. Serge Nikitin, St. Petersburg, Russia (128) ; Tashkent Observatory, Tashkent, Russia (128) ; Prof. Paul Hunfalvy, Buda-Pesth, Hungary (127, 128) ; Accademia degli Agiati, Rovereto, Austria (128) ; K. K. Geologische Reichsanstalt, Profs. Frederick Müller, Edward Suess, Vienna, Austria (128) ; Naturforschende Gesellschaft des Osterlandes, Altenberg, Germany (128) ; "Naturwissenschaftliche Wochenschrift," Berlin, Germany (128) ; Naturforschende Gesellschaft, Emden, Germany (128) ; Naturwissenschaftliche Verein des Regierungs-Bezirks Frankfurt a. O. (128) ; Naturforschende Gesellschaft, Freiburg i. B. (128) ; Oberhessische Gesellschaft für Natur- und Heilkunde, Giessen, Germany (128) ; Verein für Thüringische Geschichte und Alterthumskunde, Jena, Germany (128) ; Verein für Naturkunde, Offenbach a. M. (128) ; Verein für Vaterländische Naturkunde in Württemberg, Stuttgart, Germany (127, 128) ;

Dr. Henri de Saussure, Prof. Carl Vogt, Geneva, Switzerland (128); Académie R. Danoise des Sciences et des Lettres, Prof. Japetus Steenstrup, Copenhagen, Denmark (128); Académie Royale des Sciences, Amsterdam, Neth. (124, 125, 126); K. Zoologisch Genootschap, Amsterdam, Neth. (128); R. Zoölogical and Botanical Society at the Hague, Holland (128); Fondation de P. Teyler van der Hulst, Harlem, Holland (128); Maatschappij der Nederlandsche Letterkunde, Leiden, Holland (125, 126); R. Museum van Oudheiden, Leiden, Holland (128); Prof. Giovanni Capellini, Bologna, Italy (128); Biblioteca N. C., Florence, Italy (128); R. Istituto Lombardo, Milan, Italy (128); Prof. Giuseppi Sergi, Rome, Italy (128); Royal Observatory, Turin, Italy (128); Société Linnéenne, Bordeaux, France (126, 127, 128); Literary and Philosophical Society, Manchester, Eng. (128); Wyoming Historical and Geological Society, Wilkes-Barre, Pa. (128); Smithsonian Institution, Washington, D. C. (127, 128); Washburn College, Topeka, Kans. (125); Mr. Everard F. im Thurn, British Guiana (128).

Acknowledgments for 129: Philosophical Society, Cambridge, Eng.; Royal Statistical, Astronomical, Meteorological Societies, Victoria Institute, Royal Institution, Geological, Zoölogical Societies, Dr. B. W. Richardson, London, Eng.; Sir Richard Owen, Richmond Park, Surrey, Eng.; Royal Observatory, Edinburgh, Scotland; Mr. Horatio Hale, Clinton, Ontario; McGill College, Montreal; Geological and Natural History Survey, Ottawa, University of Toronto, Canadian Institute, Toronto, Canada; Botanical Society of Canada, Halifax, N. S.; Society of Natural History, Portland, Maine; Prof. C. H. Hitchcock, Hanover, N. H.; New Hampshire Historical Society, Concord, N. H.; Amherst College, Amherst, Mass.; American Academy of Arts and Sciences, Boston Society of Natural History, State Library of Massachusetts, Public Library, Athenæum, American Statistical Association, Mr. S. P. Sharples, Hon. Robert C. Winthrop, Boston, Mass.; Harvard College, Museum of Comparative Zoölogy, Messrs. Joseph Lovering, Robert N. Toppan, J. D. Whitney,

Cambridge, Mass.; Mr. James P. Francis, Lowell, Mass.; Free Public Library, New Bedford, Mass.; Dr. Pliny Earle, Northampton, Mass.; Essex Institute, Salem, Mass.; American Antiquarian Society, Worcester, Mass.; Rhode Island Historical Society, Brown University, Providence Franklin Society, Providence, R. I.; Connecticut Historical Society, Hartford, Conn.; New Haven Colony Historical Society, Yale University, Profs. O. C. Marsh, W. D. Whitney, New Haven, Conn.; Prof. W. LeConte Stevens, Brooklyn, N. Y.; Buffalo Library, Buffalo Society of Natural Sciences, Buffalo, N. Y.; Profs. C. H. F. Peters, Edward North, Clinton, N. Y.; New York Hospital, Astor Library, Columbia College, Academy of Sciences, University of the City of New York, Historical Society, Drs. Joel Allen, J. S. Newberry, John J. Stevenson, Prof. Ogden N. Rood, New York, N. Y.; Vassar Brothers Institute, Poughkeepsie, N. Y.; Oneida Historical Society, Utica, N. Y.; United States Military Academy, West Point, N. Y.; Prof. Henry M. Baird, Yonkers, N. Y.; Mr. Isaac C. Martindale, Camden, N. J.; Prof. Henry Morton, Hoboken, N. J.; New Jersey Historical Society, Newark, N. J.; Prof. George H. Cook, New Brunswick, N. J.; Profs. Henry F. Osborn, Charles A. Young, Princeton, N. J.; Dr. Robert H. Alison, Ardmore, Pa.; Mr. Martin H. Boyè, Coopersburg, Pa.; Mr. M. H. Messchert, Douglassville, Pa.; Mr. Eckley B. Coxe, Drifton, Pa.; Professors Traill Green, J. W. Moore, Thomas C. Porter, Easton, Pa.; State Library, Mr. Andrew S. McCreath, Harrisburg, Pa.; Prof. Lyman B. Hall, Haverford, Pa.; Mr. A. Pardee, Hazleton, Pa.; Mr. John Fulton, Johnstown, Pa.; Linnean Society, Lancaster, Pa.; Academy of Natural Sciences, College of Physicians, Mercantile Library, Engineers' Club, Pennsylvania Hospital, Historical Society, Numismatic and Antiquarian Society, Library Company of Philadelphia, Wagner Free Institute, Messrs. John Ashhurst, R. Meade Bache, Cadwalader Biddle, Andrew A. Blair, William Blasius, Geo. D. Boardman, W. G. A. Bonwill, Arthur E. Brown, Henry C. Chapman, C. H. Clark, Thomas M. Cleemann, Samuel Dickson, J. M. DaCosta,

Patterson DuBois, F. A. Genth, F. A. Genth, Jr., Fred. Graff, H. D. Gregory, Lewis M. Haupt, Angelo Heilprin, Inman Horner, Wm. W. Jefferis, G. deB. Keim, A. S. Letchworth, Morris Longstreth, Geo. R. Morehouse, F. A. Mühlenberg, Isaac Norris, Jr., Charles A. Oliver, Robert Patterson, H. Pemberton, C. N. Peirce, W. Pepper, Henry Phillips, Jr., Franklin Platt, Theo. D. Rand, Wm. B. Rogers, W. S. W. Ruschenberger, L. A. Scott, Coleman Sellers, Aubrey H. Smith, W. P. Tatham, H. Clay Trumbull, Wm. H. Wahl, Joseph Wharton, W. P. Wilson, Richard Wood, Theo. G. Wormley, Philadelphia, Pa.; John F. Carll, Pleasantville, Pa.; P. W. Sheaffer, Heber S. Thompson, Pottsville, Pa.; George W. Anderson, Rosemont, Pa.; Lackawanna Institute of History and Science, Scranton, Pa.; M. Fisher Longstreth, Sharon Hill, Pa.; Philosophical Society, Wm. Butler, West Chester, Pa.; Wyoming Historical and Geological Society, Wilkes-Barrè, Pa.; William M. Canby, Wilmington, Del.; U. S. Naval Institute, Annapolis, Md.; Johns Hopkins University, Maryland Institute, Maryland Historical Society, Peabody Institute, Baltimore, Md.; U. S. Geological Survey, Library of the Surgeon-General's Office, U. S. Naval Observatory, Smithsonian Institution, Signal Office U. S. Coast and Geodetic Survey, Messrs. S. F. Emmons, Thomas J. Lee, Garrick Mallory, M. C. Meigs, C. V. Riley, Charles A. Schott, Wm. B. Taylor, Washington, D. C.; Virginia Historical Society, Richmond, Va.; University of Virginia, Leander McCormick Observatory, Prof. J. W. Mallet, University of Virginia, Va.; Elliott Society of Science and Art, Charleston, S. C.; University of South Carolina, Columbia, S. C.; Georgia Historical Society, Savannah, Ga.; Cincinnati Observatory, Prof. J. M. Hart, Cincinnati, O.; Prof. Leo Lesquereux, Columbus, O.; Denison University, Granville, O.; Rev. Henry S. Osborn, Oxford, O.; Michigan State Library, University of Michigan, Profs. Henry S. Frieze, Alexander Winchell, Ann Arbor, Mich.; Dr. Robert Peter, Lexington, Ky.; Athenæum, Columbia, Tenn.; Prof. Daniel Kirkwood, Bloomington, Ind.; Prof. J. L. Camp-

bell, Crawfordsville, Ind.; Chicago Historical Society, Chicago, Ill.; Davenport Academy of Natural Sciences, Davenport, Ia.; State Historical Society of Wisconsin, Madison, Wis.; Colorado Scientific Society, Denver, Colo.; Washburn College, Topeka, Kans.; California Academy of Sciences, San Francisco, Cal.; University of California, Profs. John and Joseph LeConte, Berkeley, Cal.; Observatorio Astronómico Nacional Mexicano, Mexico, Mex.

Accessions to the Library were announced from the Institut Egyptien, Cairo; K. B. Gesellschaft der Wissenschaften, Prag; Accademia degli Agiati, Rovereto; K. K. Central Anstalt für Meteorologie, Wien; Physikalische Gesellschaft, K. P. Meteorologische Institut, Berlin; P. Steiner, Darmstadt; Physikalisch-Medicinische Societät, Erlangen; Naturforschende Gesellschaft, Freiburg i. B.; Verein für Lübeckische Geschichte und Alterthumskunde, Lübeck; Verein für Vaterländische Naturkunde in Württemberg, Stuttgart; F. v. Sandberger, Wiesbaden; Société de Physique et d'Histoire Naturelle, Geneva; Schweizerische Naturforschende Gesellschaft, Solothurn; Academie Royale, Société Royale des Antiquaires du Nord, Copenhagen; Aug. Nilson, Gefle; Musée Teyler, Harlem; Friesch. Genootschap van Geschied, Oudheid en Taalkunde, Leeuwarden; Maatschappij de Nederlandsche Letterkunde, Leiden; K. Zoologisch-Botanische Genootschap, 'S-Gravenhage; Académie R. des Sciences, etc., Bruxelles; Damiano Muoni, Milan; Société d'Anthropologie, Ecole Polytechnique, Paris; Académie N. des Sciences, etc., Caen; R. Cornwall Polytechnic Society, Falmouth; Philosophical and Literary Society, Leeds; Society of Antiquaries, Linnean Society, London; Natural History and Antiquarian Society, Penzance; Royal Dublin Society, Dublin; Mr. Horatio Hale, Clinton, Ont.; Royal Society of Canada, Montreal; Yale University, New Haven; Rev. Chas. G. Ames, Boston; Museum of Comparative Zoölogy, Cambridge; Mr. W. J. Potts, Camden; Natural History Society, Trenton; Franklin Institute, Messrs. W. G. A. Bonwill, Henry Phillips, Jr., Philadelphia; War Department, Gen. M. C. Meigs, Washington, D. C.

A fine photograph of the great elm tree on the "Dundas Estate," north-east corner of Broad and Walnut streets, said to be the oldest tree in the city, was presented by Miss Emily Phillips.

The Committees on Codex Poinsett and on Centennial Celebration reported progress, and were continued indefinitely.

The decease of the following members was announced to the Society :

Miss Maria Mitchell, b. Aug. 1, 1818, d. June 28, 1889, Poughkeepsie, N. Y.

M. Louis G. DeKoninck, Liege, Belgium.

Rev. Theodore Dwight Woolsey, b. Oct. 31, 1801, d. July 1, 1889, President of Yale College, New Haven, Conn.

Prof. Elias Loomis, b. 1811, d. Aug. 15, 1889, New Haven, Conn.

Prof. Osborn presented for the Transactions a paper on the "Evolution of the Ungulate Foot," which was referred to a committee to be appointed by the President, to examine and report upon. The President subsequently appointed Messrs. Brinton, Phillips and Horn as such Committee.

Mr. Phillips stated that the *Physa heterostropha*, whose reappearance he had mentioned to the Society on April 5, 1889, had disappeared in the first week of June, at about the same period as last year.

Pending nomination No. 1184 was read.

And the Society was adjourned by the presiding member.

Stated Meeting, September 20, 1889.

Present, 2 members.

Dr. HORN in the Chair.

The following correspondence was submitted: A letter from the Canadian Institute, Toronto, Canada, dated Sept. 5, 1889, accepting the Society's invitation to an International Congress for the purpose of forming a universal language.

A letter from Mr. C. F. Lee, dated Alexandria, Va., Sept. 13, 1889, making inquiries in regard to the "Lee papers."

Accessions to the Library were announced from the Statistika Central Byrån, Stockholm, Sweden; Philological Society, Cambridge, Eng.; Yorkshire Geological and Polytechnic Society, Halifax, Eng.; Astronomical Observatory of Harvard College, Cambridge, Mass.; Maimonides Library, New York; College of Pharmacy, Dr. Horace Jayne, Philadelphia; Department of Agriculture, Washington, D. C.

Photographs for the Society's Album were received from Dr. P. von Tunner, Leoben, Austria; Dr. C. A. Dohrn, Stettin, Prussia.

The Special Committee on Prof. Osborn's Paper reported it worthy of publication in the Transactions of the Society, and was discharged.

Pending nomination No. 1184, and new nominations 1188, 1189, 1190, 1191, 1192 and 1193 were read.

And the Society was adjourned by the presiding member.

Stated Meeting, October 4, 1889.

Present, 26 members.

President, Mr. FRALEY, in the Chair.

Prof. Henry D. Gregory, LL.D., a lately elected member, was presented to the Chair and took his seat.

Correspondence was submitted as follows, viz.:

Letters of envoy were received from the Royal Irish Academy, Royal Dublin Society, Dublin; Meteorological Office, London; U. S. Chief Signal Officer, Washington, D. C.

Letters of acknowledgment for Transactions, Vol. xvi, No. 2, were received from the K. Danske Videnskabernes Selskab, Copenhagen; K. Gesellschaft der Wissenschaften, Göttingen; Verein für Vaterländische Naturkunde, Württemberg.

Letters of acknowledgment for Proceedings No. 128 were

received from the Royal Society of New South Wales, Sydney; Societas pro Fauna et Flora Fennica, Helsingfors, Finland; Maatschappij der Nederlandsche Letterkunde, Leiden, Holland; K. Danske Videnskabernes Selskab, Copenhagen; K. Leopoldinische Carolinische Akademie, Halle a. S.; Vogtländische Alterthumsforschende Verein, Hohenleuben, Saxony; Société de Physique et d'Histoire Naturelle, Geneva; Dr. D. G. Brinton, Media, Pa.; Sociedad Científica "Antonio Alzate," Mexico, Mex.

A letter of acknowledgment was received from the Naturforschende Verein, Brünn, Austria, for Proceedings, Nos. 119 to 127 inclusive.

Accessions to the Library were announced from the K. K. Sternwarte, Prag, Bohemia; K. P. Meteorologische Institut, Berlin; Prof. Leopold Einstein, Nürnberg; Royal Society, London; Dr. G. W. Leitner, Woking, Eng.; Mr. Henry Mott, Montreal; Wesleyan University, Middletown, Conn.; New Jersey Historical Society, Newark; Dr. D. G. Brinton, Media, Pa.; Prof. E. D. Cope, Mr. Henry Phillips, Jr., Philadelphia; Chief U. S. Signal Officer, Washington, D.C.

A letter from the Sociedad Científica Antonio Alzate, Mexico, acknowledging receipt of Proceedings 128, and asking for 129, which the Librarian reported had been sent.

A letter from the Royal Dublin Society, in reference to exchanges.

A letter from Miss Emily Malone, County Dublin, in regard to Dr. Henry's *Æneida*.

A letter from "The Medical News," Philadelphia, requesting exchanges, which was so ordered, to begin with No. 129.

A letter from Mr. John Fulton, Johnstown, Pa., stating his certificate of membership in the Society had been lost in the great flood that destroyed his home, and requesting a duplicate, which was so ordered.

Hon. Craig Biddle read, by appointment, an obituary notice of the late Dr. Caspar Wister.

The death of Prof. George H. Cook, New Brunswick, N. J., was announced as having taken place on September 22, 1889, in the 72d year of his age.

A memoir, by Charles R. Keyes, Burlington, Iowa, on "The American Carbonic Platycerata," was presented for the Transactions and referred to a Special Committee of three to be appointed by the President. The President subsequently appointed Drs. Ruschenberger, Brinton and Horn.

Prof. Cope read a paper on "The Philosophy of Evolution."

Dr. Ryder presented a paper on the "Phylogeny of the Sweat Glands."

A paper by Dr. Harrison Allen, on "The Genus *Nyctinomus* and a Description of Three New Species," was presented by the Secretaries.

Pending nominations 1184 and 1188 to 1193 were read.

The Committee on Publication reported favorably on the paper submitted by Messrs. Scott and Osborn, and that publication thereof had been ordered.

The Committee also reported that it had considered the resolution of Prof. Cope, referred to it by the Society on May 3, 1889, and suggested the following as a substitute:

Resolved, That the printers be instructed to place on the separate issued to the contributors to the publications of the Society, the name of the publication from whence they are taken and the date at which they are ready for delivery to the author.

On motion of Prof. Cope, the resolution was amended by the addition of the words, "and that both be placed on the sheets of the separate, and not alone on the cover."

And the resolution as amended was adopted by the Society.

On motion, it was ordered that the Librarian be authorized, at his discretion, to distribute the Catalog of the Society's Library to such institutions and societies, proper to receive the same, who may desire it and do not already possess it.

The President stated he had received a letter from Mr. H. A. Hill, of Boston, Mass., requesting for the Library of the Theological Seminary, Andover, Mass., such of the Society's publications as were necessary to complete its series.

On motion, the Librarian was authorized to supply the deficiencies in conformity with the practice of the Society.

And the meeting was adjourned by the President.

*Obituary Notice of Caspar Wister, M.D.**By Craig Biddle.**(Read before the American Philosophical Society, October 4, 1889.)*

CASPAR WISTER was born on the 15th day of September, A.D. 1818, at the old homestead in Germantown, built by his great-grandfather in 1744, and continuously occupied by the family from that date.

He was the first child of Charles Jones Wister, by his second wife, who was a Miss Sarah Whitesides.

His first school-days were passed at a school in Germantown, kept by Miss Rooker. This school, of course, he soon outgrew and was then sent to Bolmar's celebrated academy, at West Chester, where he laid the foundation for his subsequent familiarity with the modern languages. Subsequently being desirous of qualifying himself as a civil engineer, he was transferred to the school of Mr. John Gummere, then a member of our Society and a distinguished mathematician, residing at Burlington, N. J. The fame of both of these teachers yet lives in their well-known educational works—those of Mr. Bolmar being mainly confined to the teaching of the modern languages, while those of Mr. Gummere concerned the mathematics. His works on astronomy and surveying have held their own to the present day, in spite of the great competition they have met with from the works of subsequent teachers.

After graduating, he became desirous of putting into practical use the education he had received, and he determined to seek employment in some new and growing country, where as a civil engineer his services would be in request.

At that time, Texas presented, he thought, the opening which he sought. The Mexican government, as early as the year 1824, had passed colonization laws and held out inducements to citizens of the United States to settle within the limits of Texas, then one of its provinces. It soon thereafter became a point of attraction for settlers from all parts of our country. Their growing strength and steadfast adherence to republican principles aroused, however, the jealousy of the Mexican authorities, and in April, 1830, an arbitrary law was passed prohibiting any future immigrations of American settlers into Texas. The attempt to enforce this law, added to other arbitrary acts of the central government, threw Texas into revolt. In the attempt to suppress this revolt by force of arms, the Mexicans met with a crushing defeat at San Jacinto, where their army was routed by a very much inferior force, under General Houston, and Santa Anna, who called himself the Napoleon of the West, was taken prisoner. This battle secured the independence of Texas, which was subsequently recognized in 1837 by the United States.

General Houston was elected President of the new republic, and by his wise administration all further difficulties both with Mexico and the Indian

tribes were settled, and there was a fair prospect of annexation to the United States, for which he strenuously labored.

Unfortunately the President was elected for a term of but two years, under the constitutional provision, which likewise rendered him ineligible for an immediately succeeding term.

Houston, to the great regret of all, was obliged to retire, therefore, from the office until he would again be eligible, when he was reelected. But in this interval more violent counsels prevailed, and the difficulties both with Mexico and the Indians were renewed. It was at this time young Wister reached Texas, where he found there was a much greater demand for soldiers than civilians. General Houston possessed in a high degree, both physically and mentally, those traits which made him a great leader of men. His picturesque appearance, his adventurous life, and his utter fearlessness, joined to his integrity of purpose, created especially in the young an enthusiasm that was irresistible. Wister at once yielded to it and enlisted under his banner as a first sergeant, in a regiment of mounted rifles.

After serving out his term of enlistment he returned at the end of two years to Philadelphia. He found, however, that he had not as yet overcome his attachment to a life of wild adventure, and at the end of six months he returned to Texas, and, renewing his connection with the army, served another campaign against the Indians. When this was finished, he yielded to the solicitations of his family and returned to Philadelphia. Here he was induced to enter upon the study of medicine as a pupil of Dr. George B. Wood, whose name and fame as a physician are so well known to us. In March, 1846, he graduated from the medical department of the University of Pennsylvania, his thesis being on the "Origin and Progress of Medicine." On the 20th of July of the same year, he married Miss Lydia H. Simmons, and settled down to the practice of his profession. He soon fell into a good practice, and secured the unreserved confidence and warm attachment of his patients. He was esteemed by his fellows as an able, cautious and painstaking practitioner, always intent upon the welfare of his patients.

In 1848, he became a member of the College of Physicians in Philadelphia, and the same year was elected physician of the Widows' Asylum. In 1849 he became physician of the Shelter for Colored Orphans. In 1852 he was elected a member of the American Medical Association, and in 1855 was appointed its Treasurer and a member of its Publication Committee. On retiring from his position as Treasurer, in 1877, the following resolution was passed by the Association:

"At the Twenty-eighth Annual Meeting of the American Medical Association at Chicago, June 8, 1877, on motion of Dr. I. F. Hibberd, of Indiana :

"*Resolved*, That this Association, in view of the retirement from the office of Treasurer of the gentleman who, for twenty-two years, has discharged the responsible and laborious duties of that situation, desires in this manner to express its high appreciation

of and full satisfaction with the promptness and completeness with which Caspar Wister has discharged the incumbent obligations of its financial agent, for so many years, and hereby tender to him the sincerest thanks of the Association for such long and honorable service."

Being a warm personal friend of Gen. McClellan, he accepted an invitation from him to join his headquarters at Yorktown. He accompanied the army on its advance from that point and its subsequent movement to the James river, being present at all the battles during that period, known as the seven-days battles.

So varied a life would have tempted most men to indulge, perhaps, too freely in personal reminiscences. But nothing was more distasteful to Dr. Wister than in any way to bring his own personality into prominence. Although no man was less bashful, few men were so modest. His wonderful power of adapting himself to the society he happened to be in, was the only thing which would lead you to suppose that he must have had a very wide experience of men and things. If he was wanted he was always ready when called on, provided that he could not persuade his friends that they had much better select some one else.

It was this absence of self-appreciation, connected with the fact of easy pecuniary circumstances, which alone prevented his occupying a more distinguished position than he did. Certain it is, that he never occupied any position, the duties of which he did not fill to the entire acceptance of every one.

Nothing, perhaps, shows this more clearly than the recital of the various associations, incongruous to almost any one else, of which he was a member, and generally a leading member. He was a Manager of the House of Refuge and a Director of the Philadelphia Library, President of the Rittenhouse Club and of the Board of Inspectors of the County Prison, member of the Academy of Natural Sciences and President of the Fencing and Sparring Club, Director of the Philadelphia Savings Fund and a member of this Society since 1859. All of these in addition to the Medical Association already referred to.

His nature was essentially genial; his frank, manly, unreserved manner was typical of his character. He inspired confidence at once, and a further knowledge of his clear judgment and honest sincerity confirmed it. He had a keen sense of humor, and his conversation, as well as the occasional products of his pen, were full of it. It was to be regretted that he could not be induced to write oftener for publication. A pleasant, graceful article, entitled, "A Cruise Among the Windward Islands—The Log of the *Vega*," which appeared in *Lippincott's Magazine*, in 1883, is a fair sample of his literary taste and capacity.

Dr. Wister's robust frame and temperate habits gave every indication that he would live to an advanced age; unfortunately, however, while alighting from a street car at the Pennsylvania Railroad Depot, at Thirtieth and Market streets, a runaway horse dashed against him and threw him with great violence against an iron post. The blow was so severe as to

fracture his skull. He, however, did not lose for an instant his consciousness, but informed those surrounding him, that he was about to meet Dr. I. Hayes Agnew in consultation at the residence of a patient and to send there for him at once. By the most skillful treatment, aided by his wonderful physical vigor, he apparently recovered entirely. This was in August, 1879, and almost to the hour of his death, on December 20, 1888, he pursued his usual vocation. During the last year of his life, he underwent great sufferings, from which the skill of his physicians was unable to relieve him. How far the frightful shock to his system had sapped his vitality and caused this trouble, it is perhaps impossible accurately to determine. He was entirely conscious that his life hung by a thread and realized as a physician that his case was hopeless. He died, however, like a soldier at his post, with the most serene courage and self-possession.

His first wife having died in 1848, Dr. Wister was happily married a second time on June 26, 1854, to Miss Annie Lee Furness, who survives him, as well as his daughter by his first wife, Mrs. Clifford B. Rossell.

An Outline of the Philosophy of Evolution.

By E. D. Cope.

(Read before the American Philosophical Society, October 4, 1889.)

Mental processes are divided into those of presentation and those of representation, or those of perception and those of ideation. A vast difference distinguishes the physiological action of these two forms of mentality. Sensuous perception is a more distinct, sometimes even a violent state of consciousness, while ideation is a much less distinct condition, although the range of its degrees of impressiveness in consciousness is very great. In a conflict between perception and ideation for the control of consciousness, the former can nearly always win, temporarily at least, in the healthy organism. But the impressiveness of perception is perhaps the cause of its remarkable transitory character. It is a fact of great importance that sensations cannot be exactly reproduced in memory, while ideas can be so reproduced. Sensations leave residua, it is true, which are the materials of ideation, but it is only ideas which memory preserves in their original form. It has been suggested * that this result is due to a destruction of tissue caused by the greater energy of sensations; while ideation, less violent, is principally constructive, organizing brain molecules into

* American Naturalist, 1886, p. 83.

relations of position which faithfully reproduce the primitive form of consciousness when consciousness recurs in them. This fact indicates that ideation is a constructive agent, a proposition which receives support from the history of animal evolution in general. It must be remarked, however, that the forms of ideation differ much in their constructive power. Emotional ideation is far less constructive than the intellectual, and of the intellectual faculties, the rational is the most persistent.

Ideation, in the wide sense, falls into the three classes indicated by Kant, those of the intellect, the emotions and the will. In the process of evolution of animals the faculties of each of these classes have played an active part in adapting the individual to the environment ; in changing its environment ; and in directing the movements of its organs ; thus affecting its structure through use and disuse. As the primitive motive in all action, we may assign the emotions in their various forms, as the appetites, the tastes, and the affections ; the emotions proper constituting the extreme expression of the class. The manner in which these execute their behests and indeed the decision as to whether they shall find executive expression or not, is determined by the intelligence. The act of execution is the will. On a purely physiological explanation of the relation between stimulus and consequent act, the word will is superfluous. But if there be any purely mental process involved which cannot be explained on dynamical principles, then the term will has an important significance. The mental activities then which have so influenced the process of animal evolution (and perhaps other evolution) fall under the two heads of motive and executive faculties, and the motives to action are either emotional or intelligent ; or, as is usually the case, of the two in mutual interaction.

At this point we at once reach the ancient question of realism and idealism. We are confronted with the crux of human thought, whether there be any forms of ideation which are not representative ; and also whether the forms of ideation determine the properties of matter, or whether they are themselves determined by the properties of matter ; and therefore whether the presentative forms, or the sensations, reveal to us a real universe not of our own making, or not. The answer to these questions constitutes our knowledge of the relations of mind to matter. On these depend the most stupendous events. These are nothing less than the persistence or extinction of mind, both that of finite beings like ourselves, but also the extinction of all mind. If mind have no sufficient control over matter, then the dissipation of energy, which inheres in the the processes of matter, must end in the extinction of mind. If on the contrary, mind has a sufficient control over matter, then we must view it as a constructive principle at work, to which the integration of matter and dissipation of energy are but secondary or complementary.

Hitherto the nature of cognition has been chiefly considered in the realist idealist discussion, but the nature of will is equally involved in it. Free will is in some sense *a priori* will or unconditioned will. I propose

to devote a few pages to this old question, both as to the intellect and the will. My apology for doing so is that our knowledge of evolution is now greater than has been the case hitherto ; and also because it appears to me that the attempt to develop a metaphysical system on a basis of Darwinian evolution has been only partially successful. Let us see what results follow the introduction into philosophy of the Lamarckian principle of evolution.

I. THE INTELLECT.

Given perception (presentation) and memory (representation), and we have the materials for the unassisted evolution of *human* intelligence in both its departments of the imagination and the reason. That such development has resulted under the conditions imposed by the environment can be doubted by no one who has studied animals. Such has been clearly the origin of the human mind with all its noble powers. It by no means follows from this fact that there have not appeared in many human minds faculties which greatly transcend anything which we observe in the highest of the Mammalia below him. In the first place, it is probable that ideation in the latter never extends beyond induction, and, in a more limited degree, deduction ; and that neither of these faculties are ever applied to their subjective states, although they evidently are applied to those of other animals and of men. And it is necessary for evolutionists to believe that the origin of the human mind being what it is, it is quite impossible that any ideas should exist in it which are not of experiential or empirical origin, no matter how much they may transcend those of the lower animals. Thus to the lessons of experience are traced the highest generalizations, as the "categories of reason" of Aristotle, and of Kant, and the fundamental axioms of mathematics and of logic. This follows necessarily from the fundamental realism of evolution, which posits the existence of tridimensional resistant matter which exhibits the two qualities of motion (energy), and in some of its forms, consciousness (mind), neither of which can transcend the limits inherent in the nature of dimensions and resistance. Thus we reach the inevitable conclusion, as pointed out by Spencer, that even the highest human faculties have been attained by experience, by slow acquisition and inheritance. And this apparent spontaneous appearance of the high powers of generalization in the mind is under this hypothesis due to the perfecting of the machine during the phylogeny of the race, by inheritance by the individual, and not to any *a priori* or intuitive powers which it possesses.

It is a curious fact that many thinkers on these subjects hold the evolutionary doctrine above described along with the idealistic philosophy. In other words they maintain, at the same time, two doctrines which are, in their extreme forms, contradictory, and mutually exclusive. If the origin of the human intelligence by evolution be true, then the theory of idealism, which is the prevalent philosophy of the century, is false ; and *vice versa*. And yet the same men cling to both, and are unable, naturally, to

harmonize them. And there is indeed truth, as usual, on both sides of the question, which will form, when harmonized, a consistent whole, and a true philosophy.

The truth of realistic doctrine is demonstrated not only by the fact of evolution, but by the general result of scientific research. The indestructibility of matter and the conservation of energy have been demonstrated in a vast number of instances. If our knowledge of the varied properties of matter is defective, the defect is growing rapidly less, and no limit can be put upon our progress in this direction. But apart from this, it is safe to infer what we do not know of the properties of matter from what we know, very much as we can infer the general characters of the lost parts of the anatomy of a vertebrate animal from its skeleton alone. Moreover, the mind is as capable of perceiving disorder as order. It appreciates the disorder of a wrecked building as readily as the order of increments of wave-lengths, of chemical equivalents, or of cusps on the tooth of a mammal; and although the knowledge of order and of disorder is organized in the subjective, the order we observe in nature is not in us, but it is in nature; it is objective, and not subjective. It is the cause of our perceptions, and our perceptions are not the cause of it.

What are the truths of idealism? Kant, while admitting the validity of sense perceptions, in opposition to pure idealism, asserted that they are only comprehensible to us through a subjective and *a priori* form of thought, and that we understand objects in accordance with that form, and not as they are in themselves. And first of all the forms of thought, those of space and time, constitute the basis of our interpretations of Nature as we see it. It is this qualified idealism of Kant which the evolutionist needs chiefly to consider.

The question has been often debated, Are these fundamental forms of thought *a posteriori* or *a priori*; are they known by experience or are they deeper than experience? If evolution be true they are only known to man, as Bain asserts, by experience. But the question again arises, Is the human mind all there is of mind in the universe? To say the least of it, such a view is open to serious question; and by most rational persons a negative reply, based on probabilities, would be promptly given. To my own understanding the restriction of mind to this speck called the Earth is highly improbable, and any assertion to that effect appears to be without sufficient basis. There being doubt then as to this point, we are compelled to examine again the qualities of mind itself to see whether there is any ground for a belief in its possession of *a priori* qualities. In this quest from an evolutionary standpoint we can have but one criterion. We cannot assume that any of them can be developed in men without experience, but we can ascertain whether any of them *are in themselves equally true in the absence of experience of an objective universe, as with such experience*. Such faculties, if possible, could be predicated in varying degrees of minds dwelling in environments differing from those of this planet, and of minds which might have existed before evolutions should have

reached their final stages here or elsewhere. In other words, such faculties would characterize mind in general as distinguished from, yet including, the human mind. But I must here insist that such mind cannot be conceived to exist apart from a dimensional (material) basis of some kind.

This classification of thought is different from the division into the contingent and the absolute, since both of these types are to be found in the experiential and in the *a priori* fields. The axiomatic properties of matter, dimensions and resistance, are not contingent, but absolute; while the movements of matter are contingent on each other and the sources (in the mental field) from which they may be derived. So also in the *a priori* field. While the axioms of logic are not contingent, many of the activities of mind are contingent on each other (and also on those of other persons) and on material conditions.

It is obvious that there are truths which are equally valid with and without the material of experience. It is also true, as shown by Aristotle, that there is a scale of generalizations, which is at the one extremity purely experiential, and at the other purely formal; and that the intermediate members of the series are on the one side experiential and on the other formal. The categories display this double validity. On the one side they express the relations of objects, and on the other, those of thoughts. Even the simple method of induction is applicable to mental noumena as it is to material phenomena. But the highest generalizations clearly have a validity independent of experience, although our race may not have discovered them without it. These are, *first*, generalizations which are exclusively formal. These are the two fundamental axioms of logic; viz., the maxim of contradiction and the maxim of excluded middle. *Second*, generalizations which, while valid as forms of pure thought, are also deducible from experience. These are Time, and the categories Modality, Relation, Quality and Quantity (Kant), etc.

The fundamental and only form allowed by Rosmini, is the "intuition of being." In its subjective human application this is the basis of the "Cogito" of Des Cartes, and the Ego of Fichte. In the same sense it is the "self-consciousness" of the evolutionary psychology. In its broader aspect it may include consciousness of all grades, and as such is a postulate of the mentality of animals as well as of men. Kant includes space with time in the forms of thought. This cannot, it seems to me, be admitted. Space is not in any sense a form of thought, but is derived from experience of matter, of which it is one of the two definitions. It is certainly not a condition of thought, as time evidently may be, *i. e.*, as succession of thoughts. This one characteristic of Kant's system made it idealistic rather than realistic.

In the following table I arrange the contents of cognition in accordance with the principles above indicated.

Experiential, a posteriori principles. Formal, a priori principles.

Material objects.	Properties.	Inductions.	Inductions.	Categories, etc.	Pure forms of thought.
Dimensions. (Space.)	Total ;	Classifications based on shape.		Order in time. Quantity. Quality. Relation. Modality.	
	External ; Internal, etc.				
Resistance. (Motion or energy.)	Molar.	Causes and effects, and classifica- tions based on them.	Psychological science.		The axioms of Logic ; <i>i. e.</i> , Maxim of Con- tradiction ; Maxim of excluded Middle.
	Molecular ; <i>e. g.</i> , tempera- ture ; color ; vitality, etc.				

The relation of these several functions of mind to its objective or material basis is both destructive and constructive. Physiological science and common experience show that they cannot be performed without the usual decomposition of matter and dissipation of energy. But evolution shows that they have also done something else of a diametrically opposite character. In the course of ages they have built up on the Earth, by successive increments, a mechanism whose function has been that of continuously developing mind. And this continuous development of mind means successive increase of control over the environment; in short, the development of a control by mind of matter. How this can have been accomplished may be considered in the following pages which treat of the will.

II. THE WILL.

The will has two aspects from which it may be viewed, the physical and the metaphysical. As the link between thought and action it represents the contact of the one with the other. If all thought be mechanical, then will does not differ from other links in the chain of causation. If, on the other hand, the universe be a psychic product, will is again but a passing phase of the stream of thought. But if mind be an attribute of matter, whose existence depends on its own success in resisting a tendency to extinction, then will is something definite, which presents the two aspects already referred to. The will, as the executive power of the mind, is either free, or it is determined by antecedent mental conditions; or as a function of matter, it is free, or it is determined by present physical conditions. Which of these propositions is true is the second question of the ages.

On the metaphysical side the will is determined by preëxistent motives, or appears to be. The situation is such that the negative of this statement cannot be clearly proven. A will which acts without motives is incomprehensible. Motiveless acts cannot be regarded as mental. It has been suggested that there is an opportunity for metaphysical freedom of will in situations and under circumstances which are prior to experience. But even in cases where there is a defect of experience, an almost inconceivable condition, the imagination will furnish motives. It is impossible to escape metaphysical determinism.

The physical action of the will is less simple. In the performance by an animal of a reflex act, we believe that the act is the direct result of a stimulus which passes into a mechanism so constructed as to release energy in the direction of, and to the end to perform, the act in question. Into such a process there enters no distinct element called will. In an animal possessed of intelligence, to ever so limited an amount, the direction of an act not reflex, is due to the presence of consciousness in the performance. This consciousness is generally supposed to exercise a directive influence until the movement has been thoroughly learned, or has become automatic, a term which is applied to acts more nearly allied to the voluntary

than are the reflex acts. The effect of the interference of consciousness is to give the act the character of design, or a direction designed to satisfy some consciously felt want. Such design is also displayed by reflex and automatic acts, but it is impossible to suppose that these have originated in any other way than as results of voluntary (consciously directed) acts by the ordinary and well-known process of automatization (cryptopnoy). Any other theory of their origin is incredible.

The process of performance of the voluntary act involves then an antecedent metaphysical element which constitutes its motive. Motives, as already mentioned, are derived from the emotions and from the intelligence. They may be classified as follows :

Emotional ;	{	Appetites, Tastes, Affections, Passions.
Intelligent ;	{	Imaginative, Æsthetic, Rational.

In various proportions and degrees some or all of these faculties inter-act as motives in all animals from the *Amœba* to man.

It has been denied that the metaphysical element enters into the performance of an act. The reason for this opinion is clear. An act by an animal is a contraction of protoplasm, either undifferentiated or as muscular fibrilla. To produce this movement a communication of motion is necessary. The metaphysical motive cannot, however, be weighed. The existence of the motive represents an expenditure of energy in the arrangement of the molecules (of the brain cells in an animal with a brain) which shall express such a form of consciousness, but there can be no correlation of energy between the significance of the motive and such expenditure of energy. Since an idea (motive) has no ponderosity, it cannot communicate motion to a nerve or muscle cell. Hence a metaphysical state cannot direct an act. For similar reasons the converse of this proposition is true. Material conditions can have no effect on mind, for that which has weight cannot impress or modify that which has no weight. Matter cannot control mind.

The only answer to this position is that it is contrary to the facts as observed. To deny that a state of consciousness can influence a current of energy, is to assert that animals do not eat because they are hungry, nor drink because they are thirsty. It is to assert that unconscious acts possess the same design in new and unexpected cases, as conscious ones, a statement which we know to be false. It is to assert that the muscles of the human tongue are not controlled by motives when engaged in the use of language. It is in fact to contradict the daily observation of mankind in thousands of instances. It is easier to believe that metaphysical

states in the form of motives control the direction of energy in spite of all the difficulties involved in the belief.

There is, however, evidence that such is the case apart from direct observation. On no other hypothesis is it possible to account for the evolution of the mechanism of the brain, the organ of mental phenomena, and of the remainder of the organism which is so well adapted to minister to its necessities. The evidence furnished by evolution is to the effect that continuous use (and disuse) of parts of the body for definite reasons (mostly appetites) have modified their form, and that such modifications have been inherited and added to by succeeding generations, until a high degree of specific adaptation, or specialization, has been reached. And this specialization is profitable to its possessor, enabling it to resist the antagonistic energies of nature, and thus to escape the early "integration of its matter and dissipation of its energy." In no other way can the development of man be accounted for, in whom the upward and progressive opposition to the downward and retrograde law of dead matter has reached its highest expression. The designed acts of animals have ever protected and multiplied them, and given them, in ever-extending degrees, control of their environment. This cannot be accounted for on any hypothesis excepting that here maintained, viz., that the metaphysical condition enters into the designed act and determines its nature or direction. The attempt to account for this evolution on the basis of natural selection exclusively, is a paralogism, since a selection does not account for the origin of anything, and evolution is the history of the origin of things.

We may now return to the consideration of the characteristics of an act of will. The first stage in the performance of an act is the formation of a judgment. This is simply the complete balance of the motives. It is a metaphysical process, a weighing of considerations derived from purely mental sources, in which the result is reached, not by comparing actual weights, but by comparing sensations and generalizations. In execution, the direction of the act is strictly derived from the judgment in the first place, and is only secondarily derived from the object of the act. Thus an animal projects one ear or the other under the influence of a single motive, curiosity. An animal climbs a tree or hides in a hole under the influence of the same motive, viz., fear. A man worships a fetish, a Brama, or a Buddha, under the single influence of religious feeling. He gives to any beggar that applies to him, under the direction of the one motive, benevolence. It is evident in all of these cases, which are but illustrations of the universal fact, that the expenditure of energy in the act of willing has no measurable relation to the result attained. Thus an animal or a man may expend more or less energy in performing any of the acts cited, according to material circumstances; as for example, the length or shortness of the ear; the height or distance of the tree; the earnestness of the worshiper, the manner of his worship, etc. Still less is there any correlation between the expenditure of energy in the brain

of the actor, and the effect of his acts on society, the world, etc., and for the same reasons. His acts enter other minds as motives, and the same process is repeated, indefinitely.

To repeat the proposition in a summary form. The character of an act of will is derived from two factors. *First*, subjective, the motives already existent in the mind; *second*, objective, the object or end towards the accomplishment of which the act is directed. In neither the first nor the second process is the law of the conservation of energy observed *on the metaphysical side*, though it doubtless is on the physical side. That is, in the formation of motives there is no correlation between the reasons adopted as sufficient, and the energy expended in weighing them. Secondly, there is no correlation between the direction taken by the act, and the energy expended in performing it. The reason for this second proposition is identical with that which explains the first. The direction or object of the act is also due to motives which only differ from those embraced in the first proposition in their later origin in time.*

The relation of these facts to the physiology of an act of will is as follows. The stimulus to act enters the brain by the sensory channels and comes, probably in the cortical cells of the anterior lobes of the hemispheres, into the structural mechanism of the intelligence. Here a mechanism exists, formed under the direction of all the mental faculties of ideation, from which a judgment issues. Or if the case be a new one, a rearrangement of molecules takes place as the combined result of the old and the new ideas, and a new judgment is formed. Here we have repeated the primitive process of creation of ideational centres. Next, the judgment furnishes the form for the outgoing act, which then repeats, on the objective world, including the person of the actor, the rearrangement of matter under its direction. Thus are modified at once, under the same judgment, the animal and its environment.

The extent to which a judgment is creative, evidently depends on its purity as judgment; only the "colorless judgment" is absolutely creative. As has been already pointed out (page 495), when discussing memory, the reproduction of mental function becomes more complete as we approach the rational faculty, and *vice versa*; it grows less as we pass successively to the imagination, the emotions, and least of all as a sequence of sensations. The coincidence of this fact, with the utility of intelligence, is not accidental. And we may then conclude that the highest creative power resides in exercise of *a priori* or formal thought, on the ground of physiological economy. We may conclude that, although the will is always strictly determined from the metaphysical side, it is free from necessity on the physical side, save only that imposed by the dimensions and resistance of matter. And in the coincidence of formal thought, which is universal thought, with conditioned freedom of will towards matter, we have the essentials of creative power, and a creative personality.

* American Naturalist, June, 1888, On the Relation of Will to the Conservation of Energy.

III. CRITICAL.

The system outlined in the preceding pages falls within the field already cultivated by Schopenhauer and especially by Hartmann. This is distinguished from those occupied by the older metaphysicians in the important function assigned to will. The older schools, both idealistic and realistic, occupied themselves chiefly with the discussion of the principles of cognition. The philosophy of evolution requires something more than this. If there be anything beyond the world and human life on it, it can be only discovered by an investigation of the nexus between mind and matter. And if there be any nexus at all, in which the mind is not entirely subordinate, it is will. If there be any directive principle at the bottom of evolution it is to be found by research in this direction.

What this will is in its essence I have attempted to show in the preceding pages. It is regarded as the *realization* of thought, as is done by Hartmann; or as the expression of energy, the degree and nature of whose rationality depends on mental conditions. But the system differs totally from the two philosophies in question in being a philosophy of the conscious and not a "philosophy of the unconscious." Automatic and unconscious will are derived from the conscious by cryptopnoy, and not the reverse. The result is thus theistic and not atheistic, and optimistic and not pessimistic. It is the Darwino-Hartmannian system inverted. For although Hartmann's system promises progress through pain, as must any system of evolution, it does not furnish any rational basis for progressive evolution, but is essentially retrogressive, pessimistic, and nihilistic. It is Darwinian and not Lamarckian.

As regards the fundamental doctrine of Spencer, the relativity of knowledge, the present method brings us to the result, that the scope of such relativity diminishes directly as the generalization in constitution of the physical basis of mind. For this method postulates the existence of mind as prior and not subsequent to organization, a fact demonstrated by organic evolution. And although so long as there is a physical basis there is no "absolute" in action, the will is sufficient for creative functions, both subjective and objective.

The Ethnologic Affinities of the Ancient Etruscans.

By Daniel G. Brinton, M.D.

(Read before the American Philosophical Society, Oct. 18, 1889.)

The problem of the ethnologic position of the ancient Etruscans must be considered as yet unsolved. In spite of the prolonged labors of Corssen and Deecke, the theory that attached the Etrusci to the Indo-European stock rests on such feeble foundations that it is rejected by some of the ablest specialists in this branch; while the Turanian or Ugric origin, so vehemently advocated by Dr. Isaac Taylor, Mr. Robert Brown, Jr., and others, is now dismissed as untenable by all the continental Etruscologists.

As for those other hypotheses which connect the inhabitants of Etruria with the ancient Copts, with the Israelites, with the Lydians, with the Armenians, with the Hittites, with the Celts, with the Basques, and what not, they never had enough in their favor seriously to attract the attention of scholars.

One defect in these theories has been that they were all based on one ethnic element only. Their authors seem unaware that in the present condition of ethnologic science it is insufficient to deduce conclusions from the language only, or the arts only, or the legends, or the physical features only, of a nation; all these must be taken into account where the problem is complex, and the verdict of each must be carefully weighed.

My attention was especially called to this problem while spending some months in Italy early in the present year, where I had the opportunity of seeing the many museums of Etruscan antiquities which are so intelligently preserved and displayed in that country.

I had reached the Italian shores by the most ancient traveled route from the coast of Africa, that, indeed, which was taken by the pious Æneas himself, sailing from Carthage by way of the Isle of Pantellaria to Marsala, the ancient Lilybæum.

On a clear day one is rarely out of sight of land on this crossing; for no sooner do the bold headlands on either side of ancient Carthage sink in the south-west than the volcanic cone of Pantellaria rises in sight; and when that is lost to view the mount-

ainous coast of Southern Sicily is soon perceived. The distance between the two islands is not quite sixty English miles, an interval of space which was not enough to offer any serious barrier to even very early ploughmen of the Mediterranean main.

I dwell on these geographic details with a purpose, as you will see later; and I mention the fact of my journey in Africa, as it was the observations I made there which first led me to the conclusions I am about to present in this paper. Part of my time had been passed on the borders of what is called "la Grande Kabylie," that portion of the province of Algiers which is inhabited by the Kabyles, the most direct descendants of the ancient Libyans.

They are a strange people, these Kabyles, both in customs and physical aspect. Natives of Africa time out of mind, many of them present the purest type of the blonde races, blue or gray eyes, tawny beard, fair complexion, curly light or reddish hair, muscular in build and often tall in stature. When I came to look at the many evidently portrait busts on the tombs of the ancient Etruscans, there was something in the features, in the shape of head and face, which reminded me of these Kabyles. Slight as it was, it induced me to compare the two peoples in other details, and it is the result of this comparison which I now submit to be weighed and judged by those competent in such matters.

§ 1. *Geographic Position of the Ancient Etruscans, historically considered.*

Etruscan remains are found in Italy from the Gulf of Salerno to the River Po, and from the Tyrrhenian sea to the Adriatic. One inscription, indeed, has been unearthed at Verona,* perhaps one near Chiavenna, and even at Chur I was shown one, in the Rhætian Museum, which the curator averred had been dug up near that city. Certain it is, however, that the right bank of the Po was substantially the northern limit of Etruscan culture.†

They were essentially city-builders and city-dwellers, and at the height of their power, which we may put about five or six

* See Mueller, *Die Etrusker*, Bd. 1, s. 157. References to this important work are always to the second edition (1877), edited by Deecke.

† Comp. Prof. G. Sergi, in the *Archivio per l'Anthropologia*, 1883, p. 139.

hundred years before the Christian era, they appear to have had three federations of twelve cities each, within the limits I have named. This statement might easily lead to an excessive idea of their numbers; but it is well ascertained that the Etruscans constituted by no means the bulk of the population. They were only the ruling class, a slave holding aristocracy, while the large majority of the inhabitants belonged to native Italian tribes, as the Umbri, the Osci, the Ligures, and others.

All the ancient writers recognize the Etruscans as intruders on Italian soil, and they themselves are said fully to have acknowledged this, and indeed to have had certain legends as to the time and place of their first permanent settlement on the peninsula. It is only in utter defiance of these semi-historic reports that Virchow and others* bring them down from the Alps, across the plains of Lombardy, through the defiles of the Appenines, and at length to the shores of the Tyrrhenian sea. Neither the classical historians nor the Etruscans themselves knew a vestige of such a tradition. The erudite Otfried Muller, who has collected everything to be found in Greek and Latin literature concerning them, states that it is the unanimous testimony of antiquity that the earliest Etruscans reached the western shore of Italy, crossing the sea from the south; and he adds that it is undeniable (*undenkbar*) that such was the belief of the Etruscans themselves.† We know that by tradition and religious customs they assigned as their first permanent settlement the city of Tarquinii, the modern Corneto, on the shore of the Mediterranean, twelve miles north of Civita Vecchia. To this venerable site the priests and soothsayers resorted from all parts of Etruria to perfect themselves in the pure and ancient "Etruscan discipline." Here their hero-god Tages, a wondrous gray-haired boy, sprang into life from a ploughed furrow, and taught their ancestors the mysteries of the diviner's craft and the nobler arts of life. This locality, I say, according to uniform tradition, was where their progenitors first established themselves, crossing the sea from somewhere to the south. Such a tradition, so definitely preserved, cannot be cast aside without sound reasons.

The date of this landing has been given by Müller at about

* Prof. Virchow has expressed this opinion in the *Verhandlungen der Berliner Gesellschaft für Anthropologie*, 1884, p. 208, and elsewhere.

† *Die Etrusker* Bd. I, ss. 66, 67, sqq.

two hundred and ninety years before the founding of Rome, while other writers are inclined to put it earlier by five hundred years. Between a thousand and twelve hundred years before the Christian era is probably as near as we can now fix it.

Now that the extensive excavations in Etruscan sites enable us to have a survey of the whole field of their operations, it is conceded more and more that the line of their migration was from south to north, from cisapennine to transapennine localities. Their settlements at Marzabotto, Bologna and beyond were visibly later and of briefer duration than in Etruria proper.* The Etruscan alphabet of North Italy also reveals plain marks of degeneration, and the forms of the inscriptions are less archaic.†

§ 2. *Physical Traits of the Etruscans.*

We do not have to depend upon guess-work for a knowledge of the physical features of the Etruscans; we have a vast realm of mimetic art preserved, much of it unquestionably faithful to the originals, and in spite of the frequent custom of incineration, hundreds of genuine Etruscan skeletons have come down to us in a good state of preservation.

It surprises me that, in spite of this, and although the anthropometric results I am about to quote have been published for years, Dr. Deecke, in his recent edition of Müller's *Etrusker*, takes no note of them, but repeats the old statement that this people was short in stature, heavy-set, obese and dark.‡ Of course Dr. Isaac Taylor,§ in order to give countenance to his theory that the Etruscans were Turanians, is glad to adopt this opinion. He would not have liked to take cognizance of the modern anthropologists who have studied the subject, for nothing more fatal to his theory can be imagined than their results.

The old notion seems to have arisen from expressions in two late Roman poets, Virgil and Catullus, who speak of the Etruscans as fat; *pinguis Etruscus* and *obesus Etruscus* are their

*Speaking of Marzabotto, the "Etruscan Pompeii," Prof. Eduard Meyer says in a recent article: "Sie zeigt, dass die Nachricht der Alten richtig ist, welche die Etrusker von Süden her ins Po-Land vordringen lassen." *Correspondenz-Blatt der deutschen Gesell. für Anthrop., Ethnol. und Urgeschichte*, Januar, 1889. He is fully supported by Prof. Sergi and most of the Italian archæologists who have studied the remains on the spot.

† Müller, *Die Etrusker*, Bd. ii, s. 529.

‡ *Die Etrusker*, Bd. i, s. 64, note.

§ In his work entitled *Etruscan Researches*.

words. It has also been commented on that the Etruscan cinerary urns frequently represent short, stout men, with disproportionately large heads and arms. This, however, was merely a technique of the national artists. They often put all their work on the upper, and effaced the lower portion of the figure, as not presenting individual characteristics. Where the full figure is shown, as in some beautiful specimens in the Museum at Florence, the squat appearance referred to is not apparent.

Fortunately we do not have to rely on the contradictory testimony of art to learn the stature of the Etruscans. The Italian anatomists have measured two hundred of their skeletons and from these have deduced, in accordance with well-known osteologic rules, the height of the average individual. The result shows them to have been an unusually tall race, the average of the two hundred persons having been 1.75 metres, or very nearly five feet nine inches.* This is greater than the average height of our soldiers during the war, which was 1.70 metres, and is rather above the average of the soldiery of any European nation to-day, though less than some of the picked corps, the French carabineers, for example. It is a little more than the average stature of the Algerian Kabyles, who, nevertheless, are a tall race, averaging above 1.70 metres.†

Dr. Taylor and his followers do not fare better when it comes to cranial measurements. The typical skull of the Turanian stock is short and roundish—brachycephalic; that of the Etruscan was markedly of the long type—dolichocephalic. MM. Hovelacque and Hervé quote the results of three extended measurements of the cephalic index by Italian craniologists as showing 75.6, 76 and 77.3.‡ Less than a fourth of the crania can be called brachycephalic.§

It is interesting to compare these figures with measurements from the skulls of the modern descendants of the ancient Libyans—the Kabyles. According to data furnished by two excellent observers, MM. Topinard and Lagneau, these are respectively 76.7 and 77.3, almost absolutely the same as for the old Etruscans.

There is a current tradition in Italy that the Etruscans were

* Paul Topinard, *Éléments d'Anthropologie Générale*, p. 498 (Paris, 1885).

† *Ibid.*, Chap. xlv.

‡ Hovelacque et Hervé, *Précis d'Anthropologie*, p. 577 (Paris, 1887).

§ A number of authorities are quoted to this effect by Prof. G. Sergi, in the *Archivio per l'Antropologia e la Etnologia*, 1883, p. 140.

blondes, with light hair and blue eyes. I met a Tuscan wine-merchant who lived near Florence, and he pointed with pride to his handsome blonde beard, informing me that his family claimed Etruscan descent and that his beard was proof of it! There is evidence from ancient art that this piece of folk-lore is correct, and the eminent anthropologist I have just quoted, M. Topinard, sums up, with his usual correctness, our anthropologic knowledge of this people when he says: "From the evidence before us we may decide that the Etruscans were of large stature, blondes, and dolichocephalous; while their predecessors, the Umbrians, were small and brachycephalous." *

In all these physical traits we discover a coincidence with the ancient Libyan or true Berber type, as seen in the Kabyles of the Djurdjura mountains, the Rifians of Morocco, and the former inhabitants of the Canary islands, the Guanches. There is no doubt but that the last mentioned were a true branch of the Berber stock. The fragments of their language, which have been collected and critically edited by Sabin Berthelot † and others, prove that it was closely allied to the dialect of the Morocco Rifians. Their skeletons show them to have been an unusually tall race, quite a number of individuals ranging from six to six and a half feet in height. ‡ Their skulls present the same dolichocephalic index as the Kabyles, and that they were largely blondes is attested by the early navigators, who speak of their long yellow hair reaching down to below their waists. § The presence of these blondes on the Canaries destroys the theory sometimes advanced that the blonde hue of the Kabyles arose from admixture with the Goths, at the period of the dissolution of the western empire; for the Canaries were peopled by the Berbers long before the Christian era, and Dr. Verneau has quite recently discovered Numidian inscriptions there. || But for that matter this hypothesis is untenable for other reasons. The blonde Berbers are referred to on Egyptian monuments, and as for the

* "Les Etruscains etaient grands, blonds et dolichocephales," *Eléments d'Anthropologie*, p. 498.

† *Antiquités Canariennes*, Paris, 1879.

‡ Dr. R. Verneau, *La Tuille des Anciens Habitants des Iles Canaries*, in the *Revue d'Anthropologie*, 1887.

§ "Crines longos et flavos usque ad umbilicum feré," says the chronicler of the expedition sent out by Alphonso IV. Ample evidence is collected by Berthelot in the *Bulletin de la Société d'Ethnologie*, 1845, p. 121, sqq.

|| *Revue d'Anthropologie*, 1887, p. 650.

Goths in Africa, they had entirely disappeared as early as when Procopius wrote his history. *

All this goes to show that the physical type of the ancient Etruscans was the same as that of the ancient Libyans and entirely distinct from any then existing on the Italian or Hellenic peninsulas. This identity can be traced in other features of importance to the anatomist. The orbital index of the modern Kabyles is 88.1, of the Etruscans 87.4, a remarkable approximation; the nasal indices of both range between 44 and 49; in both there is a lack of accentuation of the cranial prominences. †

§ 3. *The Culture Elements of the Etruscans.*

Wherever the first settlers of Tarquini came from they do not seem to have brought with them the higher arts of life. Most of these were later acquisitions, learned from their neighbors, the Greeks of Sicily and Magna Grecia, and in longer voyages for trading and piracy, which extended to Greece itself, to the coasts of Asia Minor, to Egypt, and to the Semitic cities of Palestine and their colonies at Carthage and elsewhere. Etruscan art yields positive testimony to all these influences, especially that of the Greeks. The Etruscan alphabet appears to me to have been derived directly from the Greek, and not from the Phœnician, as Rawlinson‡ and others have thought. We must carefully exclude all these external borrowings if we would make a correct comparison of real Etruscan culture-traits with those of other nations. When this is done, it will be found that, in some characteristics, they stood in bold relief from all the nations I have mentioned.

No one of these is more conspicuous than the position assigned to woman in Etruscan civilization. It was in astonishing contrast to her place among the polished Greeks, and still more so to her station in oriental life. With the Etruscans, evidently a strictly monogamous people, she was the equal and the companion of her husband. She sat by his side at the feasting board, she was

* Quoted by Berthelot, *ubi supra*, p. 141, note. Topinard identifies the Libyans with the *Lebou* and *Tamahou*, enemies of the ancient Egyptians, and figured on monuments of the Nineteenth Dynasty as of lofty stature, blondes, with blue eyes and long, waving, yellow hair. *Éléments d'Anthropologie*, p. 209.

† The details of these measurements may be found in the works of Topinard and of Hovelacque and Hervé, already quoted.

‡ In his work, *The Origin of Nations* (New York, 1881).

cared for in the most attentive manner, her image was carved with his on their common tomb, and there are a thousand evidences that she was not merely the idol, but the honored helpmate of the man. It was from this Etruscan example that early Rome drew the principle of monogamy and of the substantial independence of woman; and whatever we have of that noble element in modern life, it is a legacy through Rome from ancient Etruria.

This was decidedly neither a Hellenic nor an eastern principle, but we do find it from the earliest times among the Berbers. Even in spite of the polygamous doctrines of Mohammedanism the woman still retains her position in Kabyle life as the companion and helpmeet of man. Their *Kanoun*, or ancient code of laws, often in conflict with the Koran, and always respected in preference to it, protects her autonomy in a variety of ways,* and the independence of her position has been a frequent theme of comment with travelers.

Another marked and peculiar element in Etruscan life was the recognition of the principle of confederation in politics. Their league of twelve independent cities was the first of its kind in the ancient world. Canon Rawlinson forcibly points out how far it was superior to the temporary and unstable alliances of the Greeks.† In this lay the secret of the rapid and great success of Etruria.

Here again is a singular identity with North Libyan governmental features. The very word *Kabyle*—the Arabic *q'bail*—means “confederation,” and refers to their ancient system of a political union of thoroughly independent communities. Nor is this a recent growth. The name by which the Kabyles were known to the Latin writers was *Quinquegentes*, “the Five Nations,” referring to the coalition which then as now existed among them.

The Etruscans were bold navigators. For more than a century—600–500 B. C.—they were the virtual masters of the Mediterranean. It may be objected that in this they were unlike

*The *Kanoun* of the Algerian Kabyles has been published, in full, by MM. Hanoteau et Letourneux, *La Kabylie et les Coutumes Kabyles* (Vol. iii, Paris, 1873). See also on the position of woman among the Kabyles, L. Piessé, *Algerie et Tunisie*, p. lxxv (Paris, 1888).

†In the *Origin of Nations*, above quoted.

the Libyans; but it must be remembered that the Libyans undoubtedly did at that time venture out into the Atlantic as far as the Canary islands and peopled them—a greater distance from land than the passage of the Mediterranean requires.

I can not pursue this parallel in other directions, for lack of material. We know something about the Etruscan religion; but Christianity and Mohammedanism have effaced every vestige of the ancient cult of the Berbers. The architecture of the Etruscans was wonderful, but beyond the fact that the ancient Libyans were builders of megalithic monuments and of dwellings of cut stone,* little has come down to us regarding their knowledge of this art.

§ 4. *The Etruscan Language.*

One of the ablest of ancient historians, Dionysius of Halicarnassus, asserted that the Etruscan language was *sui generis*, without affinity with any other. Such seems to have been also the most recent verdict of modern linguistic research. Dr. C. Pauli, one of the best authorities on it now living, pronounces all attempts to trace its relationship to be failures;† and Dennis, the learned English Etruscologist, states his opinion that it is as isolated as the Basque.‡ Dr. Pauli, indeed, decries all attempts to trace, in the present state of our knowledge, its affinities, and himself sets the example of studying it from its own monuments alone.

These monuments are not insignificant. We have preserved to us, more or less complete, over six thousand inscriptions in the Etruscan alphabet and language, a few of them bilingual, usually with the Latin. We know the value of the Etruscan letters, and up to a certain point the phonetics of the tongue. Some words have been preserved to us in Greek and Latin writers with their meanings, and the sense of others can be approximately made out from their recurrence in a great many inscriptions of a certain

* There is evidence from Latin writers that the Tuariks, one of the purest blooded of the Berber tribes, constructed dwellings of cut stone before the advent of the Roman legions. For the extracts showing this, see an article by N. Bibaseo, on the Kabyles, in the *Revue des Deux Mondes*, Dec., 1865.

† In his suggestive essay, *Die wahre und die falsche Methode bei der Entzifferung der Etruskischen Inschriften*, printed in the *Altitalische Studien* for 1885.

‡ *The Cities and Cemeteries of Etruria*. Introduction.

class. We also have the numerals, and a multitude of proper names, personal and geographic.

If with this apparatus at command I venture to disregard Pauli's warning, and to institute a comparison between the Etruscan and Libyan languages, it is because I think the material is sufficient at least to be worth the attention of students. So far as I know, no one has attempted any such comparison before; nor do I find that this possible origin of the Etruscans has as yet been advanced, obvious as it seems to be.

One reason of this has doubtless been the extremely little available knowledge of the Libyan tongues, ancient or modern. What we do definitely know may be briefly rehearsed.

The modern Libyan, or Berber, is spoken by hordes scattered from Timbuctoo to the Mediterranean, and from the shores of the Atlantic to the borders of Egypt. It is divided into a number of dialects which are phonetically grouped into two classes, the "strong" and the "weak," characterized by the regular transformation of certain consonantal sounds, principally *k* to *l*, *t* and *θ* to *d* or *r*, *s* to *ch*, etc. When the action of these phonetic laws is understood and allowed for, the fundamental unity of all the dialects becomes apparent, both in their vocabulary and grammar.*

The themes are both nominal and verbal, but the latter are much the more numerous and form the grammatical characteristic of the group. They are nearly all consonantal, and may be of one, two, three, or four letters, subject to internal vowel change, and modification of the idea by prefixes and suffixes.

The modern Kabyle, which has adopted many Arabic words, is written with the Arabic alphabet, which, however, does not render correctly some of its sounds. The Touareg, the dialect of the desert, has preserved an alphabet of its own, no doubt a form of the ancient Numidian, which in turn was derived from the Semitic Carthaginian. The Tamachek, as this venerable A B C is called, does not express the vowel sounds nor separate the words. It is said to have been retained principally through the efforts of the women, who are the literatæ of the tribe.†

* René Basset, *Manuel de Langue Kabyle*, p. 3 (Paris, 1887).

† This statement is made by Bibasco, in the article above quoted, *Revue des deux Mondes*, Dec., 1865. The Tamachek alphabet is given by Hanoteau in his *Grammaire Kabyle* (Paris, 1860). This writer adds that the Touareg is one of the purest dialects of the Berber tongue (*id.*, *Introd.*, p. xiii).

The ancient Libyan or Numidian was the parent stem of these dialects. Some hundreds of inscriptions in it have been preserved, a few of them bilingual, so there is a possibility that we may recover the grammar of this now lost tongue.* Prof. Newman, indeed, has made an effort to restore it from modern Berber dialects;† but I am surprised that he has made no use of this valuable epigraphy.

These various Libyan dialects form the western branch of a large family of tongues, of which the eastern branches include the modern and ancient Coptic, the Abyssinian and others. The whole family has been called *Hamitic*, or *Cushite*, or *Proto-Semitic*, of which terms the first is the best, simply because it conveys no preconceived hypothesis. The grammar of all the Hamitic languages shows similar traits. The nouns have a masculine and feminine form; the radical may be of one or more syllables and, unlike the Semitic tongues, it remains unaltered in the process of word-building; there are plural but not dual forms; relation is expressed by both prefixes and suffixes; and the verb originally had but one form, instead of the two or more found in the Semitic languages.‡

The general grammatic aspect of these languages, however, leaves no doubt but that at some remote epoch they were derived from the same original form of speech from which the Semitic languages trace their descent; hence, they are classified as the *Hamito-Semitic* stock.

Where was the original seat of the tribe who spoke this parent tongue has not been ascertained. The uniform opinion of scholars has been that it was somewhere in Western Asia; and though the question does not immediately concern the present discussion, I cannot forbear adding that I hold this to be a mistake, and that the original seat of the Semites was on or near the Atlantic coast.

It is with the Libyan branch of the Hamitic family of languages that I shall proceed to compare the ancient Etruscan.

* They have been edited by General Faidherbe, Prof. Halévy, Renan and others.

† *Libyan Vocabulary: an Essay toward reproducing the Ancient Numidian Language.* London, 1882.

‡ These are substantially the characteristics of the family as traced by Friedrich Müller in his *Grundriss der Sprachwissenschaft*, and by Hovelacque in his work, *La Linguistique*.

The Etruscan alphabet, as I have already said, was derived from the Greek. It represented twenty sounds, as follows:

Vowels: a, e, i, u.

Mutes: c (=k), p, φ, t, θ, χ (guttural).

Linguals: l, r.

Nasals: m, n.

Sibilants: s', s, z (s' = soft s); (z, originally ts).

Spirants: h (spiritus asper), v (= u), f (the digamma).

It will be noticed that the vowel o was not expressed, and that a number of consonantal sounds found in Latin and Greek are absent.

The orthography of the Etruscan inscriptions shows either that these letters did not fully express the sounds of the language, or else that it possessed many phonetic variations. The principal of these are as follows:

h into f, χ, φ, θ, and *vice versa*.

t into θ, h, d, and z, and v. v.

s into c or z, and v. v.

Initial e and terminal n were often omitted.

It is certain there were various vowel sounds which were not written; there is no doubt, for instance, of the identity of the forms *epl* and *pul*; of *eprone* and *purone*, etc. The extent of these changes has very properly been made a subject of careful study by the epigraphists.*

Very little has been gleaned from the inscriptions as to the grammar of the Etruscan. The best authorities on the subject are Deecke and Pauli, and both agree that the Etruscan nouns have a gender presenting masculine and feminine forms, by this cutting the language off of all connection with the Turanian stock. The nouns have also plural terminations, and both nominal and verbal themes are modified by suffixes and less frequently by prefixes. Pauli considers the demonstrative pronouns to be, "without doubt," *an*, *cen* and *mi(n)*.

Conjugations and declensions have not been fixed, though it is believed that a terminal *s*, often attached to words, is the sign of the genitive or possessive case; and a terminal *ce* seems to indicate a past tense in verbals. A terminal *-c* and *-m* are supposed to be suffixed copulative conjunctions, like the *-que* in Latin. †

* On these phonetic variations, see Pauli in *Etruskische Forschungen und Studien*, 1882, Heft iii, ss. 18, 23, 27, 28, etc., and elsewhere. Also Deecke, Appendix on the Etruscan Language, in Müller's *Die Etrusker*, Bd. ii.

† For these particulars, compare Deecke in *Etruskische Forschungen und Studien*, 1882, Heft ii, s. 62, sq., and Pauli in the same, Heft iii, s. 146, and elsewhere.

These meagre outlines give small chance for comparison; but there is nothing in them to contradict the theory of Libyan affinities. The latter has also masculine, feminine and plural forms of nouns, and though it has strictly no declensions, the terminal *s* is found in it with the same possessive signification. It is not a case ending, but the possessive pronoun of the third person, "his" or "her."* As for articles,† definite or indefinite, there is none, either in Etruscan or Libyan.

The ascertained vocabulary of the Etruscan is a short one. The classical writers have handed us down a few words more or less disfigured no doubt; and certain constantly recurring words on inscriptions give chance for a fair guess as to what they must mean. From these sources I present the following list, marking those from ancient writers with an asterisk, and some from modern students with their initials.‡ The list includes, I think, every Etruscan word of which we know the probable meaning.

Etruscan Vocabulary.

**aesar*, deity, divinity.

**antar*, eagle.

**aukelos*, aurora, dawn.

**ataison*, the vine.

aθ, man, *vir*, D.

ara, race, family, "gens," P.

atar, family, P.; house, D.

avil, year; old; aged; "ætas."

alpan, image, statue; gift; "supplex," E.

zama, gold, P.

zilaθ, a priestly title, D.

θura, descendant, D., P.; brother, Sch.

θrafna, cup, vase.

θaura, grave, sepulchre.

θui, he lies, "cubat;" *θui cesu*, "hic cubat."

* Thus, *akkkham*, house; *akkkhamia*, his or her house. Basset, *Manuel de Langue Kabyle*, p. 12. The suffix is either *s*, *ia*, or *es*.

† Prof. A. H. Sayce has attempted to show that the suffixed *-s* or *-es* in Etruscan is the definite article, but I have not observed that this opinion has been adopted. *Altitalische Studien*, 1893, Heft II, pp. 127, 128.

‡ P. — Pauli, D. — Doecke; E. — Ellis; Sch. — Schaefer B. Bugge, etc.

ixu, a stone (or *exu*).

itun, a pot, a vase, P.

**ituo*, to divide.

eca, this; here, P. Subst. verb "to be," D., B., etc.

etera, a freedman; a slave; a servant.

ca, this; *cav*, in this; or *ceher*, or *cn*.

ceça, tribe, P.; an official priestly title, meaning holy; or sexigenarius from *ceça*, sixty, P.

ceçasic, a priest or priestly title.

capi, a vessel, a cup.

clan or *clen*, a son, P.; "sepulchral," from *cela*, grave-vault, "grabkammer," B.; "soboles or princeps," E.

caru, or *cares*, or *cerinu*, or *cerixu*, a monument or tomb; a memorial; "sculptit," E.

cver, a gift; a present; an offering; "soror," E.

**cassis*, a helmet.

hindia, a ghost or departed spirit.

**falando*, the sky, heaven.

frontac, the lightning thrower, "fulguiator."

farthana, monument, P.

**lar*, lord or chief; a household god; elder brother.

**lucumo*, a prince, a priest, lit. "inspired," "possessed."

lautni, slave; freedman; family.

leine, died; to die; "vivit," E.

lupu, to die; died; dead.

maru, *marva*, or *mar nu*, a priestly title, D.

malena or *malstria*, a mirror.

mi, this, P.; to be, D.

muki, a cup, a bowl.

mur or *mur-s*, a grave, a sepulchre.

mulun, to give; to dedicate or consecrate.

mutna, a tomb, a sepulchre.

penθna, a stone, P.

puia, a wife, P.; a daughter, E.

ril, to live, lived ; *ril avil*, " vixit annos ;" a year, E.

**tamnos* (δαμνος), a horse.

tular, a stone ; a monument ; public, D. ; tomb, E.

tur-, to give, to make an offering.

tiv-s, moon, month.

trōtnvōt, a soothsayer, Lat. " haruspex."

tesan, a dedication ; ten.

usil, sun, day.

**verse*, fire ; " averte."

ϕleres, a statue, an image ; an offering.

nefts, grandson ; probably Latin " nepos."

netsvis, augur.

nipe, cup, vase.

nesl, a grave, a sepulchre, " mortuus," E.

nacnva, a grave, a tomb.

spura, town, city, commonwealth, " res publica," D. ; conqueror, P.

sez, daughter.

svthi, sepulchre, tomb, burial place, D. ; " it is," P.

subic, property ; it belongs to, P.

svai-ce, to live, lived.

There are a number of these words which, I think without straining, may be explained from Libyan roots. I take them up in the order in which they are arranged in the vocabulary :

Aesar, a god. This may be derived from the Libyan (Tuareg) *asr*, light ; *esan*, lightning ; as *deus* from *deva*, the bright, the shining one. The lightning is the constant accompaniment of the chief Etruscan deity.

Aukelos or *ankelos*, the dawn, the daybreak. This appears certainly to be allied to the Kab. verb *akker*, to rise ; *θenker*, the sunrise, the dawn.

Ataison, the vine ; Kab. *θsa*.

Aθ, man; *ara*, descendants, gens; *atar*, family. These are extremely important words, frequently recurring on the sepulchral inscriptions and at the commencement of proper names; also in the connection *clen-ar-*, "son (?) of *ar-*." They constitute one of the strongest points of evidence of the Libyan origin of the Etruscans, for in all the Libyan tribes this syllable *at-*, *ar-*, *ath* or *ait*, is the sign of tribal kinship, like the *Beni* of the Arabs. In the dialect of the Guanches it appears with precisely the same form and meaning as in Etruscan, *at*, *ad* and *ar*, as the initial syllable of many words.* In the Tuareg we find *arach*, offspring, etc. All are from an ancient Libyan monoliteral root *κ*, seen in Kab. *arou*, *erou*, aor. *irou*, "produire, engendrer," *l'arach*, "tribu," etc.†

Alpan, an image or statue. This seems to me the most likely meaning of the word. In the Tuareg dialect *awan*, which has the same signification, seems a weakened form of the same root.

Zilaθ; believed by Deecke to be the title of a priest. This is probable, and connects it with the Kab. *zelir*, aor. *izla*, to sacrifice; the *zilaθ* being the "sacrificer."

oura, descendants, children (D. and P.); brother (Sch.). This is another striking identity between the Libyan and Etruscan in terms of relationship. It is the Kab. *θerga*, Guanche *l'hu-*, as a prefix to the name of a gens. These parallels confirm the correctness of the rendering of the inscriptions.

θrafna or *θarfna*; a cup or bowl. Compare the Berber *tarbut* or *tarfut*, an earthen dish.

Ixu or *exu*, means a stone or something of stone; *cerixu*, a stone tomb. The same root seems to appear in Kab. *azekka*, a stone tomb.

Ituo, an Etruscan word preserved by Festus, with the meaning "to divide." It seems plainly identical with the Kab. *ibilha*, to divide; Tuareg, *itsun*, he divided.

Cver, to give, is not remote from the Kab. root *fkr* with the same signification.

* Berthelot, *Mémoire sur les Guanches*, calls especial attention to this linguistic trait as connecting the various Berber tribes.

† P. Olivier, *Dictionnaire français-kabyle* (Le Puy, 1878). I do not much rely on this work, as it lacks critical value.

Eca; this word begins many inscriptions, and appears to mean "this" or "here," and has been usually so rendered. It would thus correspond with the Kab. *agi*, which has the same senses. Others think it the substantive verb; Kab. *eg*, to be, aorist, *iga*.

Ca or *ke*, rendered by Pauli as the demonstrative "this," is identical in sense and sound with the Kab. demonstrative *gi* (*g* hard).

**Lar*; this term frequently occurs with *aruns*, and by some the former is supposed to be elder, the latter younger brother; or that *lar*, *lars*, or *alarθ* = chief, lord. I suspect both are from the Libyan root *ar*, to beget, engender, whence Kab. *argaz*, man, etc. See above under *aθ*.

Maru; a priestly title. Comp. Kab. *mer*, to teach.

Mur-s, grave; properly "his grave." Com. Kab. *mūth*, death; *emmout*, or *emmeth*, to die; *medhel*, to bury.

Mutna, a tomb; probably from the same Libyan root, *mut*, as *mur*, q. v.

Tamnos, a horse. This may be a Hellenized form of the word for "mare," Kab. *thagmarth*, where the *th* initial and final is the sign of the feminine gender.

Tur, to make an offering. Comp. Kab. *θarzesth*, pl. *tirdzaf*, an offering.

Tiv-s, moon, month. Comp. Kab. *tiziri*, moon, month.

Usil, sun, day. The Kabyle term for the midday sun is *asal*, and it is noteworthy that the Etruscan day began when the sun was at high noon.*

The Etruscan Numerals.

It is confidently believed among Etruscologists that we know the words for the first six numerals in that language. They are found inscribed on a pair of dice exhumed near Toscanella in 1848. A serious difficulty presented itself, however, in ascertaining in what order these words should be read. The majority of ancient dice have the pips so arranged that the sum of the opposite sides equals seven, thus: 1+6, 2+5, 4+3. A number of North Etruscan dice have been reported where this is not the order, but the following: 1+2, 3+4, 5+6. Dr. Pauli avers that no other order of the pips

* Müller, *Die Etrusker*, Bd II, n. 301.

on Etruscan dice has been observed;* but in this he errs, as Mr. Stewart Culin, who closely examined the Etruscan dice in the British Museum, informs me that more than ten per cent of them show yet other arrangements, so that it is quite possible that the dice from Toscanella should be read on a scheme differing from both the above.

The six words on the dice in the order in which I should propose to read them are :

maz, ci (ki), zal, huθ, θu, sa.

In assigning these their respective values of 1, 2, 3, 4, 5, 6, I am supported by many of the leading students of the subject, as the following list will show :

<i>Etruscan Word.</i>	<i>Value.</i>	<i>Authorities in favor.</i>
<i>ma,</i>	1,	Campanari, Pauli, Taylor, Ellis, Bugge, Brown.†
<i>ci</i> or <i>ki,</i>	2,	Taylor, Deecke, Brown.
<i>zal,</i>	3,	Campanari, Taylor, Ellis, Brown.
<i>huθ,</i>	4,	Campanari, Pauli, Ellis.
<i>θu,</i>	5,	Taylor, Brown, Pauli.
<i>sa,</i>	6,	Campanari, Bugge, Ellis.

I need not rehearse the evidence in support of these values. It is derived from patient comparative study of inscriptions in which these numerals occur, and is certainly as well substantiated as any other.

It is well known that the numerals present a most valuable standard of linguistic comparison, and the utmost efforts, therefore, have been put forth to exhibit some relationship of the above words to the numerals of some other tongue. The result has been utter failure in every instance, as has been vigorously stated by the acute

*" Antike Würfel mit anderer Ordnung giebt es durchaus nicht." Pauli, *Etruskische Forschungen und Studien*, 1882, p. 11. So far is this from being correct that I have the notes of over a dozen irregular ancient dice, observed by M. Culin in the collection of the British Museum alone.

† Mr. Robert Brown's article is the latest study of Etruscan numerals. It is in *The Archaeological Review*, for July, 1889. Unfortunately its value is impaired by the writer's devotion to Dr. Taylor's notion of the Turanian origin of the Etruscans. Pauli on *Die Etruskischen Zahlwörter* may be found in the *Etruskische Forschungen und Studien*, for 1882; and Bugge partial discussion of them in the same journal for 1883. For Ellis' opinion see his *Asiatic Affinities of the Old Italians*, p. 51, sqq.

investigator, Pauli.* So far as I know no comparison of them with the ancient Libyan has heretofore been attempted.

It is important at the outset, to note that the above numeral adjectives belong to a rather late Etruscan period, and do not present the ancient forms of the words. These have been obtained by a comparison of ancient inscriptions, and are presented as follows, by Pauli and others :

1, *mez*; † 2, *cin*; 3, *sals*; ‡ 4, *hut*; 5, *θuns* or *fnes*; § 6, *sas*.

These are the forms which we must use for our comparison as being the most archaic.

A similar process must be carried out with the modern Libyan numerals; we must restore them to their earliest forms.

At present the Kabyles employ the Arabic numerals for values higher than two. Recourse must be had, therefore, to the Tuariks and other tribes who retain the old expressions. An examination proves that the ancient Libyan was a quinary system, based, as most primitive numeration, on counting the fingers. The word for hand, *fous*, still means *five* in several of the dialects, as the Djerba and the Mzab. || In these quinary systems, drawn from the fingers, the word for *one* often means "the little one," referring either to the short thumb or the little finger. At present the word for *one* in the Berber dialects is some variation of *en*, which seems a loan word from the Greek or early Latin (*εν, unus*). Probably their native expression was *mekk*, or *mez*, which means "a little one;" for not only is that in accord with the general rule of quinary tongues, ¶ but we find the Cretans used the word ἄμαχτες, borrowed, probably, from the Libyans, in the sense "a single one" (Bugge).

* His words are: "So wenig die Etruskischen Zahlwörter indogermanisch sind, so wenig sind sie mit irgend einer andern bis jetzt verglichenen Sprache verwandt, sie stehen bis jetzt vollständig isolirt," *ubi suprâ*, p. 148.

† See C. Pauli on the Etruscan Inscription in the Museum of Leiden, in *Altitalische Studien*, 1884, p. 61.

‡ Bugge gives as other forms of *zal*, these variants—*zeval, zelar, zerar, zerin*, *Etrusk. Forsch. u. Studien*, 1883, p. 156.

§ The form *fnesi*, where *θ* has passed into *f*, a frequent permutation in the inscriptions, is quoted by Bugge, from the Inscription F. 2335d.

|| Basset, *Manuel de Langue Kabyle*, pp. 70, 71.

¶ "Number," says J. Hammond Trumbull, in his philosophical essay on the numerals in American tongues, "begins at 'two,' and we may assume that 'two' was the first actual numeral, though an earlier conception may be expressed in the name given to 'one.'" He adds that, in "many" American languages, the expression for "one" means "the little one," "the least," the reference being to the finger. *Transactions of the American Philological Association*, for 1874, pp. 50, 72.

The modern Libyan for *two* is *sin*; for *three*, *karat* (in the Gdhames dialect, *kalat*; in Bilin, *sadu* or *salu*); *four* in modern Kabyle is *akoz*, which may be remotely connected with the word for four in the eastern dialects of the Hamitic family (Coptic, *febu* and *stou*); *six* in Kabyle is *sez*, in the ancient dialect of the Guanches (Canary islands), *sas-etti*, evidently identical with the old Coptic *sas*.

With these restorations I would place the two alphabets side by side as follows, showing the consonantal roots at the base of the numerals in accordance with the spirit of the Hamitic languages :

Archaic Etruscan.

1. M^oχ.
2. Sⁱn.
3. S^al.
4. F^ut.
5. F^uns.
6. S^as.

Archaic Libyan-Hamitic.

- M^oχ.
- Sⁱn.
- S^al.
- F^ut.
- F^us.
- S^as.

The similarity here displayed appears to me quite convincing that the Etruscan, if not a Libyan dialect, was certainly a branch of the Hamitic family, with closer relations to the Libyan than to the eastern dialect of the family.

It would be profitable to continue this comparison between the Libyan and Etruscan into the domain of proper names, geographical, personal and tribal, for which there is considerable material. At some future time I hope to accomplish this, but at present I shall confine myself to two prominent examples, one, the native names of the Etruscan people, *Rasena*, or Etrusci, the other, the name of their hero-god or mythical tribal ancestor.

The historian, Dionysius of Halicarnassus, states that they called themselves "*Rasena*," and the forms *rasn* and *rasnia* are found on inscriptions, in connections where the signification "people" or "folk" would be suitable.* On the other hand, Dr. Pauli believes that there is strong testimony that their native name began with *turs*, which, by elision of the vowel and adoption of a suffixed *e*, became *Etrs-ci*, or more fully *Etrusci*.†

**Ras'an*, *populus*; *rasena*, *popularis*; *ras'nia*, Etruria, are the proposed renderings of Pauli. *Altitalische Studien*, 1884, p. 60.

† "Das vorgeschlagene *e* ist im Etruskischen mehrfach nachweisbar. *Etrusci* = *Etrac* = *Tursci*—dies ist ein Beweis das der *einheimische* Name der Etrusker mit *turs* begann." Pauli, *Etrusk. Forsch. und Studien*, 1882, p. 18.

The only method to bring these statements into unison is to consider \mathfrak{R} 's the biliteral radical; *et* or '*t*', the prefix; and *enna* and *ci*, suffixes of different sense. This suggestion harmonizes the inscriptions, bears out the statement of Dionysius, and moreover finds its explanation in the Libyan. The prefix *et* or '*t*' is the modern *ait*, Guanche *at*, which I have before shown is repeatedly seen in Etruscan. It conveys the sense "the children of Ras," or "those of Ras." What this "Ras" may mean I am not sure; but that it was a local name of some importance in ancient Libya is evident from the list of Roman bishoprics before the arrival of the Arabs, two of which, in the heart of the Kabyle country, were named *Rus-ucurru* and *Rus-azouz*.* The termination *enni* in Kabyle is the suffixed demonstrative pronoun, and is equivalent to "those of Ras," or "the Rases," supplying the place, in a manner, of the prefix *et*.† The *ci* (ki) or χi is a suffix which appears also to be demonstrative.

The name of their hero-god, considered by some to be allied to the radical *turs*, is *tarx*. It is seen in the appellations *Tarquinius*, *Tarchetius*, and the like. These doubtless refer back to *Tarchon*, the mythical founder of the first settlement at Tarquinii, and the father or finder of the hero-god *Tages* (*Tarxes*), to whom I have before referred. To him the royal line of the Tarquins traced their origin. It is not easy to combine this radical with *ras*, and I prefer to believe them distinct. In the form *tax* or *tar*, it is quite common in the Libyan dialects. It appears in the name of the Numidian rebel who gave the Emperor Tiberius so much trouble, *Tacfarinus*, and M. Berthelot pointedly calls attention to its frequency among the Guanches of the Canaries.‡ The signification of the radical I leave for future investigation, mentioning, however, the root A-GH-L or A-GH-R in modern Libyan, from which the Kabyle words *aghalik*, king, and *0agheldi0*, kingdom, are de-

* Hanoteau et Letourneux, *La Kabylie et les Coutumes Kabyles*, Tome i, p. 312. This of course proves that it is not the Arabic *ras*, head, cape.

† Basset, *Manuel de la Langue Kabyle*, p. 17. This suffix is invariable, e. g., *argaz-enni*, that man; *irgazen-enni*, those men. It occurs elsewhere in Etruscan as *Cleenna*, *Vipina*, *Spurina*, *Porsenna*, etc. Bugge thinks it appears in the termination *annat*. See *Etruskische Forschungen und Studien*, 1883, Heft iv, ss. 4-6.

‡ *Mémoire sur les Guanches*, in *Mémoires de la Société d'Ethnologie*, Tome II. One might be inclined to bring the tribal appellation *Tuarek* into this connection; but Wetstein and others consider it an Arabic form from *terek*, "reliquere." See *Zeitschrift für Ethnologie*, 1887, p. 35.

rived, the latter of which would give the Latinized forms *tac* or *tarq*.

In conclusion, I would submit the following as the results of this inquiry :

1. The uniform testimony of the ancient writers and of their own traditions asserts that the Etruscans came across the sea from the south and established their first settlement on Italian soil near Tarquinii ; this historic testimony is corroborated by the preponderance of archæologic evidence as yet brought forward.

2. Physically the Etruscans were a people of lofty stature, of the blonde type, with dolichocephalic heads. In these traits they corresponded precisely with the blonde type of the ancient Libyans, represented by the modern Berbers and the Guanches, the only blonde people to the south.

3. In the position assigned to woman and in the system of federal government the Etruscans were totally different from the Greeks, Orientals and Turanians ; but were in entire accord with the Libyans.

4. The phonetics, grammatical plan, vocabulary, numerals and proper names of the Etruscan tongue present many and close analogies with the Libyan dialects, ancient and modern.

5. Linguistic science, therefore, concurs with tradition, archæology, sociologic traits and anthropologic evidence, in assigning a genetic relationship of the Etruscans to the Libyan family.

Stated Meeting, October 18, 1889.

Present, 20 members.

Vice-President, Dr. RUSCHENBERGER, in the Chair.

Correspondence was submitted as follows, viz. :

A letter from Bureau of Statistics of Labor, Commonwealth of Massachusetts, offering its publications to the Society and requesting exchanges, which was so ordered.

A letter from the Commissioner of Public Records of Parishes, Towns and Counties of Massachusetts, in reference to records reported as missing.

A letter from the Geological Survey of Missouri requesting exchanges, which on motion was so ordered.

Letters of acknowledgment were received from the Deutsche Geologische Gesellschaft, Berlin (127); Academie Royale des Sciences, Lisbon (Transactions, xvi, 1; Proceedings, 128); Phillips Academy, Andover, Mass. (Transactions [N. S.], i-xv, xvi, 1; Proceedings, 96-110; Catalogue, Parts i-iv); Rev. J. A. Murray, Carlisle, Pa. (128).

Acknowledgments for 129: Prof. Serge Nikitin, St. Petersburg; Prof. Peter R. von Tunner, Leoben, Austria; K. K. Central Anstalt für Meteorologie und Erdmagnetismus, Dr. A. Brezina, Vienna; Deutsche Geologische Gesellschaft, K. P. Meteorologische Institut, "Naturwissenschaftliche Wochenschrift," Berlin; Verein für Erdkunde, Dresden; Vogtländische Altertumsforschende Verein, Hohenleuben; Verein für Thüringische Geschichte und Alterthumskunde, Jena; Verein für Naturkunde, Offenbach a. Main; Dr. Carl August Dohrn, Stettin; R. Comitato Geologico, Rome; Prof. Abel Hovelacque, Paris; Prof. Lucien Adam, Rennes, France; Royal Dublin Society; Royal Society of Edinburgh; University Library, Prof. J. P. Postgate, Cambridge, Eng.; Society of Antiquaries, Mr. C. Juhlin Dannfelt, Sir James Paget, London; Literary and Philosophical Society, Manchester; Sir Henry W. Acland, Prof. J. J. Sylvester, Oxford; Dr. Alfred R. Selwyn, Ottawa, Canada; Rev. J. A. Murray, Carlisle, Pa.; Dr. D. G. Brinton, Media; Messrs. Samuel Castner, Jr., Edwin J. Houston, George Stuart, Philadelphia; Elisha Mitchell Scientific Society, Chapel Hill, N. C.; Mr. Everard F. im Thurn, Georgetown, British Guiana.

Letters of envoy were received from the K. P. Akademie der Wissenschaften, Berlin; Citizens' Committee of the Constitutional Centennial Celebration, Philadelphia.

Accessions to the Library were announced from the R. Geological Society of Australia (N. S. W. Branch), Sydney; K. K. Geologische Reichsanstalt, Vienna; K. Akademie der Wissenschaften, Berlin; Neues Archiv für Sächsische Geschichte und Altertumskunde, Dresden; Prof. E. Renevier, Lausanne;

R. Academia de Ciencias, etc., Madrid; University Library, Cambridge, Eng.; Editors of "Nature," London; Mr. W. E. A. Axon, Manchester, Eng.; Citizens' Committee of the Constitutional Centennial Celebration, Editors of the "Medical News," Commissioners for the Erection of the Public Buildings, Messrs. Clarence H. Clark, Henry Phillips, Jr., MacCalla & Co., Philadelphia; Commissioner of Labor, Washington, D. C.; State Historical Society, Madison, Wis.; Lick Observatory, Sacramento, Cal.

The Special Committee on the paper by Charles R. Keyes reported progress and was continued.

The stated business of the meeting was then taken up, and pending nominations Nos. 1184, 1188, 1189, 1190, 1191, 1192, and 1193 were read, spoken to and balloted upon.

Prof. Daniel G. Brinton read a paper on "The Ethnologic Affinities of the Ancient Etruscans."

Prof. John A. Ryder read a paper on the "Proofs of the Effects of Habitual Use in the Modification of an Animal Organization," upon which some remarks were made by Prof. Cope, Dr. Allen and Dr. Horn.

Dr. Horn made the following remarks:

The mention of *Scarabæus* (*Ateuchus*) *sacer* by Prof. Ryder brings forward several species in our own fauna. *Deltochilum gibbosum* has no anterior tarsi in either sex, and, like the *sacer*, might be used as an evidence of the persistence of a character gradually acquired through repeated mutilation, that is, a loss of the tarsus by the digging which these insects perform. On the other hand, the numerous species of *Phanæus* do quite as much digging and the anterior tarsi of the male only are wanting. It is true that many females are seen which have lost their anterior tarsi by digging; have, in fact, worn them off; but in recently developed specimens the front tarsi are always absent in the males and present in the females. If repeated mutilation has resulted in the entire disappearance of the tarsi in one fossorial insect, it is reasonable to infer that the same results should follow in a related insect in both sexes, if at all, and not in the male only. It is evident that some other cause than inherited mutilation must be sought for to explain the loss of the tarsi in these insects.

Prof. Edwin J. Houston made the following oral communication upon "Crystal-Studded Hail Stones:"

The hail storm which occurred at Philadelphia, near sunset, on October

1, 1889, presented some peculiarities which the author desires to place on record.

The storm was heralded by the usual bands of dark clouds and a high wind velocity. A fall of rain was followed by a copious fall of hail. The storm was of short duration and was rapidly followed by a clear sky.

An examination of a number of hail stones which fell on a grass plot in the northern section of the city showed the following peculiarities, viz.:

(1) Most of the larger stones examined were nearly spherical in shape, with only a slight tendency to an oblately spheroidal shape. Some of them varied in diameter from an inch to an inch and a quarter.

(2) The smaller stones were, on the contrary, so markedly oblately spheroidal as to closely approach in many instances the shape of flat discs.

(3) Cross sections of the stones showed the usual concentric layers of alternate opaque and transparent ice.

(4) The nucleus of the stones examined was of opaque ice.

(5) The outer layer of nearly all the stones, and without exception of all the larger stones, was of opaque ice.

These peculiarities are common to nearly all hail stones, and are only referred to in connection with a peculiarity I have never before noticed in hail stones, nor have I ever seen the same referred to in the literature of the subject.

On the outer surface of a number of the larger stones examined, well-marked crystals of clear transparent ice projected in some instances for a full quarter of an inch. These crystals, as well as I could determine from the perishable nature of the material, were six-sided prisms with clearly cut facets, and well-marked terminal faces. The crystals projected from the surface of the stone in the direction of their greatest length. They closely resembled the crystals so common in geodes where the mineral matters are slowly deposited from the mother liquor.

The size and transparency of the crystals, and the well-defined character of their edges and faces, indicated their formation under conditions favorable to crystalline growth, among the most essential of which are time, and comparative freedom from motion during formation.

It would appear, therefore, that the stones must have been in a condition of actual or comparative rest in a mass of vapor-saturated air for a short interval of time after their formation, and immediately before their fall to the earth.

The conditions of rapid motion so usually assumed in the generally accepted theories for the formation of hail are so opposed to such a rest of the hail stones, that the condition of rest in the stones appears to be improbable, unless such theories be considerably modified.

It has been suggested, however, that an actual rapid motion of the stone, while surrounded by an accompanying mass of vapor-laden air, would place the stone in a position of relative rest as regards the air, and so give the crystals the opportunity required for growth.

Whatever meteorological conditions may have existed during the forma-

tion of these crystal-studded hail stones, are apparently unusual, since such stones are far from common.

I have called attention to the phenomena, not for the purpose of suggesting any explanation for the formation of these peculiar stones, but merely to place on record an observed fact.

After all the other business of the meeting had been disposed of, the ballot-box was opened by the Secretaries and the votes being counted the result of the poll was reported to the presiding member, who declared the following to have been duly elected members of the Society, viz. :

No. 2160. Walter J. Hoffman, Washington, D. C.

No. 2161. J. W. Powell, Washington, D. C.

No. 2162. G. Brown Goode, Washington, D. C.

No. 2163. Lyon G. Tyler, Williamsburg, Va.

No. 2164. James B. Angell, Ann Arbor, Mich.

No. 2165. Henry Hazlehurst, Philadelphia.

No. 2166. David K. Tuttle, Philadelphia.

And the Society was adjourned by the presiding member.

Stated Meeting, November 1, 1889.

Present, 14 members.

Dr. RUSCHENBERGER in the Chair.

Mr. Henry Hazlehurst, a newly elected member, was presented to the Chair and took his seat.

Correspondence was submitted as follows:

Letters accepting membership in the Society were read from No. 2160, Dr. Walter J. Hoffman, Washington, D. C., October 24, 1889.

No. 2161, Major J. W. Powell, Washington, D. C., October 21, 1889.

No. 2162, George Brown Goode, Washington, D. C., October 22, 1889.

No. 2163, Hon. Lyon G. Tyler, Williamsburgh, Va., October 24, 1889.

No. 2164, Prof. James B. Angell, Ann Arbor, Mich., October 23, 1889.

No. 2165, Henry Hazlehurst, Philadelphia, October 21, 1889.

And No. 2166, David K. Tuttle, Philadelphia, October 22, 1889.

A letter was read from the American Folk-lore Society announcing that its first annual meeting would be held at Philadelphia on November 29 and 30, 1889.

A letter of envoy was received from the U. S. Commission of Fish and Fisheries, Washington, D. C.

Acknowledgments were received from the Asiatic Society (China Branch), Shanghai (126, 127); Comité Geologique, St. Petersburg (128); Dr. Hermann Rollett, Baden-bei-Wien (128); Naturhistorischer Verein, Bonn (128); Kansas Academy of Science, Topeka (127, 128); Don Mariano Barcena, Mexico (128).

Comité Geologique, St. Petersburg; Dr. O. Donner, Helsingfors, Finland; Société R. de Zoologie, Natura artis Magistra, Amsterdam; K. Zoologisch-Botanisch Genootschap, Gravenhage; Fondation de P. Teyler van der Hulst, Harlem; Senckenbergische Naturforschende Gesellschaft, Frankfurt-am-Main; Naturhistorische Gesellschaft, Hanover; Verein für Erdkunde, Metz; R. Biblioteca N. Centrale, Firenze; Mr. Tomasso Cannizzaro, Messina, Italy; Prof. G. Sergi, Rome; Société des Antiquaires de la Morinie, St. Omer, France; Prof. William Crookes, London, Eng.; Prof. James Geikie, Edinburgh; Admiral Edw. Y. McCauley, Dr. David K. Tuttle, Philadelphia (all 129).

Accessions to the Library were announced from the Tokio Library; Prof. G. D. E. Weyer, Kiel; K. Statistische Landesamt, Stuttgart; Instituto y Observatorio de Marina de San Fernando; R. Geographical Society, London; Heirs of Dr. James Henry, Dublin; Dr. Charles C. Abbott, Trenton, N. J.; Massachusetts Bureau of Statistics of Labor, Boston; Pennsyl-

vania Geological Survey, Harrisburg; William S. Baker, Henry Phillips, Jr., Dr. Charles A. Oliver, Philadelphia; Johns Hopkins University, Baltimore; National Academy of Sciences, Department of State, U. S. Commission of Fish and Fisheries, A. S. Flint, Gen. M. C. Meigs, Washington, D. C.; Direccion del Gobierno del Estado de Michoacán, Morelia, Mex.

The Committee on C. R. Keyes' Paper reported progress and was continued.

The deaths of the following members were announced :

M. Gaston Planté, Paris, May 21, 1889, æt. 55.

Prof. Leo Lesquereux, Columbus, Ohio, October 21, 1889, æt. 83.

Mr. Henry Winsor, Philadelphia, October 29, 1889, æt. 86.

On motion, the President was authorized to appoint suitable persons to prepare the usual obituary notices of Mr. Winsor and Prof. Lesquereux.

Prof. Ryder read a paper entitled "A Physiological Theory of the Calcification of the Skeleton."

Prof. Cope presented a "Geological Survey of the Concho Country, Texas," by Prof. J. W. Cummings and Dr. Otto Lerch.

A communication read from Mr. Burnet Landreth in reference to an Association of Centenary Firms and Corporations of the United States was ordered to be filed.

On motion of Dr. Brinton, the Committee on Finance was requested to consider and report at the next meeting upon the expediency and propriety of the Society's subscribing \$50 towards the expenses of receiving and entertaining the Convention of the American Folk-lore Association, about to meet in this city at the University of Pennsylvania, on November 29 and 30, 1889.

Dr. Brinton made the following motion :

Resolved, That the Secretaries be authorized to communicate with the officers of the other scientific societies and libraries in Philadelphia, for the purpose of preparing a Union List of Scientific Periodicals open to the members of all scientific societies by proper introduction.

Dr. Morris moved to amend by striking out all after the word *Periodicals*.

Mr. Horner moved to amend by inserting after *Periodicals* the words "taken by them."

Prof. Heilprin moved to amend by inserting after *Periodicals* the words "including Transactions and Journals."

The amendments were accepted by the original mover, and the resolution, as finally amended, was unanimously adopted as follows :

Resolved, That the Secretaries be authorized to communicate with the officers of the other scientific societies and libraries in Philadelphia, for the purpose of preparing a Union List of Scientific Periodicals, including Transactions and Journals taken by them.

And the Society was adjourned by the presiding member.

The Phylogeny of the Sweat-Glands.

By Prof. John A. Ryder.

(Read before the American Philosophical Society, October 4, 1889.)

The suggestion of the descent of the Mammalia through a reptilian ancestry has been favorably received by many naturalists. In this connection, those singular Permian types described by Prof. Cope under the name of *Theromora* may be recalled. The *Theromora* present certain striking resemblances to the monotremes, but what their integuments may have been like in microscopic structure we shall probably never know. And it is just upon this question of integumentary structure that much of high taxonomic importance rests. Upon examining the integument of vertebrates the general plan of structure is found to be very similar in all of the orders. The main differences arise (1) through variations in the thickness of the epiblastic epidermis and the mesoblastic dermis or corium; (2) the arrangement of the connective-tissue fibres of the latter, and (3) the absence or degree of development of glands in connection with the epidermis.

The tendency of the fibres of the corium to interlace in three directions in fishes is marked, and may be best seen in selachians and chondrosteans, while it is equally striking amongst Marsipobranchii. The fibres seem to be disposed in annular layers, between which longitudinal layers are disposed, while the whole is firmly bound to the subcutaneous connective tissues by fibres which traverse the meshes of both the preceding layers, this third

class of fibres having a direction which is vertical to the outer surface of the body.

In the other groups the fibrous layer or corium departs more or less from this primitive arrangement; the type which presents the least departure from the arrangement of the elements of the two integumentary layers of fishes are the Batrachia. Above the Batrachia, the subcutaneous layer begins to show the fibres running irregularly without such an obvious arrangement of laminæ. This is the case in Reptilia, but in Aves, over the feathered areas, there is a tendency for the fibres of the corium to be disposed in coarse quadrangular or lozenge-shaped meshes, the decussations of which correspond to the points of insertion and mode of arrangement of the deeply implanted feathers.

In Mammalia there is the greatest variation in the thickness of the epidermis. In the elephant the epidermis is quite thin, but the corium in the most exposed parts is of enormous thickness and contains a great proportion of elastic fibres, that kind of tissue reaching a most phenomenal development in this form, even invading the adipose and muscular tissue in all parts of the body of the animal.

In the Cetacea and hippopotamus the epidermis is much thickened and the papillæ of the corium greatly elongated. These two forms are amongst those which depart most widely from the usual type characteristic of Mammalia, in that in the first the sudoriferous glands appear to be wanting, and the corium is rudimentary, while in the latter they are modified into the remarkable organs concerned in the secretion of the red exudation, "bloody sweat," which has been noticed by many writers, but which was never adequately studied until examined by Max Weber.*

The development of the glands of the skin, which are always in direct genetic relation with the epidermis, opens up questions of considerable phylogenetic interest, and to call attention to these is the purpose of the present note. If we tabulate the classes of vertebrates according to the degree of development of the dermal glandular organs some singular as well as interesting contrasts are brought out and clear evidence of the method of evolution of these organs is also obtained.

A.—1. The fishes (selachians, teleosts, etc.) tend to develop numerous scattered unicellular glands of the skin, as goblet cells.

These single-celled structures have doubtless multiplied side by side and given rise, first, to a pit, then by further invagination to a flask-shaped glandular appendage of the epidermis, somewhat according to the method suggested by Lang. † In this way the simplest form of epidermal gland, such as is seen in the Batrachia, may be supposed to have arisen.

It is at least suggestive that the persistence of goblet cells in the alimentary tract and bladder of some forms (the bladder being primarily a diverticulum of the intestine) is an inheritance from the gastrulated stage

* Studien über Säugethiere. Ein Beitrag zur Frage nach dem Ursprung der Cetaceen. 8vo, Jena, 1886.

† Lehrbuch der Vergleichenden Anatomie, 8vo, Jena, 1858, p. 39, Figs. A, C, D, E.

of metazoan development, seen in the living Cœlenterata, in which the goblet-cell type of epidermal gland first appears. This persistence is due to the persistence of the physical conditions favoring the survival of such a primitive type of gland, the epithelium of the alimentary canal of even the highest types being constantly bathed with fluids, in much the same way as the skins of the lowest aquatic vertebrates and the cœlenterates are constantly in contact with the surrounding water.

2. The marsipobranchs are anomalous. The slime glands or lateral sacks of *Myxine*, with their singular coiled-up bodies, first described by J. Müller, are not of epidermal origin, but lie in or beneath the corium.

The representatives of the goblet cells are the refringent clavate glandular cells so numerous and embedded at various depths in the epidermis of the adult lamprey, with their narrow bases resting upon the corium. In the young lamprey these cells are superficial and rounded, occupying more nearly the position of goblet cells. The inference, therefore, is that the Kolben and Körner-zellen of the epidermis of marsipobranchs have wandered inwards from the surface into the deeper parts of the epidermis, and have been probably derived from what were primarily goblet cells.

B.—1. The Batrachia are characterized throughout by the possession of a remarkably developed system of epidermal glands. The function of these organs in batrachians is doubtless manifold, while their structure is extremely simple, being mere flask-shaped organs over most of the integument, and having a very extensive distribution, extending even over the eyelids, tympanic membrane and under surfaces of the manus and pes. The only departures from the simple flask-shaped type of the skin glands in this group is on the under surface of the pes and manus and in the parotid region of certain salamanders (*Chioglossa*, Wiedersheim). In some of these cases there is a slight tendency for these organs to become racemose; but this is rare and exceptional, just as it is rare and exceptional for the sudoriferous glands of Mammalia to become racemose, those of hippopotamus showing this tendency (Weber).

The function of the epidermal glands of Batrachia is to pour out a whitish, viscid and very acrid secretion. The inner ends of the secretory cells of the walls of the glandular sacks are sharply defined and are separated by a very distinct outline from the mass of secreted matter contained in the follicle. The method of secretion is therefore not akin to that of the cells of a mucus gland; the nuclei of the secreting cells do not, as in the latter, occupy a quite peripheral position.

The secretion is, however, very mucus-like, as is easily learned upon handling the common frog where the skin is constantly bathed by the secretion. It is known to be also very poisonous if injected into the blood of warm-blooded animals, the secretion being also highly poisonous to other species of batrachians if injected into their vessels, death in all cases resulting in a few hours.

It is also intensely acrid in some if not in all forms; that secreted by

the skin of a living *Hyla carolinensis*, if placed upon the human conjunctiva, produces an intense burning sensation similar to and almost as uncomfortable as that produced by red pepper brought into contact with the same parts. This experiment with the secretion of *Hyla* the writer upon one occasion accidentally inflicted upon himself. The acrid and poisonous properties of the secretion are therefore also probably protective in a high degree to the various forms of Batrachia, which are otherwise but poorly provided with organs of offense and defense.

Another purpose which these glands also subserve is that of keeping the skin constantly moist, in this manner making the integument more efficient as a respiratory organ, such a function of the integument being highly developed in the Salientia.

It is not certain if these organs also serve as an excretory apparatus, but it is highly improbable that an apparatus so highly differentiated as are these epidermal glands of the Batrachia and which secrete so actively and directly to the exterior, should not also be found to serve as emunctories somewhat after the manner of the sudoriferous glands of Mammalia. I therefore regard it as highly probable that they are also excretory in the sense that they share in the process of the discharge of waste matters.

As to their structure the following may be remarked. They are obviously formed in absolute continuity with the epidermis. They lie just beneath the epidermis, or they may be said to be sessile or without any stalk-like duct leading from the saccular portion to the epidermis to the exterior. The canal, however, which passes from the gland through the epidermis has flattened cells differentiated in its walls, so that one may say the efferent duct presents the character of a canal with a wall formed of flattened elongated cells, the whole duct being embedded in the epidermis. At the point where the saccular portion of the gland and its duct join there is evidently a very gradual transition from the cells of the glandular part of the organ to those of its duct. Whether the smooth muscular fibres which run nearly parallel with each other from the point where the gland passes into the duct to the fundus of the latter are derived from the epidermis or not cannot be made out with certainty from the structure of the adult skin. These flattened muscular elements taper towards the duct and converge toward one point at their opposite ends over the inner globular end or fundus of the gland. In teased preparations the relations of these muscular fibres to the gland may be very distinctly seen, reminding one somewhat of the manner in which the curved cycle of staves forming the sides of a barrel are joined together by their edges. There is only one layer of these smooth muscular fibres, though in some cases the edges of two adjacent fibres seem to slightly overlap each other. The very intimate union of the gland, its duct and its muscular investment, and the close union of the whole to the overlying epidermis, indicate very clearly that the mode of origin of the structure is that which has already been described, viz., a simple involution of the epidermis. The only part of this whole structure the epidermal origin of which is in doubt are the

smooth and longitudinally disposed muscular fibres, though it is to be borne in mind that just beneath the closely grouped globular or flask-shaped glands there occurs the outer non-fibrous and granular layer of the corium which contains no cellular elements. This non-nucleated layer is followed by the rather thick fibrous corium, containing connective-tissue cells. This layer of fibrous matter has a horizontal disposition and the included cells are much flattened, and like the fibrous tissue are parallel to the surface. Then follows the second or deepest layer of pigment, and in this latter the principal dermal blood vascular network is embedded. This deeper vascular network, however, joins a much less developed and more superficial vascular network of capillaries, which ramifies just beneath the epidermis, their junction being effected at intervals by means of small vessels, which penetrate the inner fibrous and outer granular layers of the corium. This outer capillary plexus forms a mesh of vessels just below the epidermis. This outer plexus also forms more or less complete plexuses about the globular glands already spoken of. The blood vascular plexus is incomplete over the deeper ends of the glands, but narrow lymph channels and spaces surround them. These lymph spaces are probably continuous with the intercellular spaces between the deeper strata of epidermal cells, and communicate with the larger intercellular lymph passages which are very obvious between many of the cells of the second or penultimate layer; the direct outward communication of these wider intercellular superficial passages seems, in fact, to be shut off by the presence of the outermost layer of epidermal cells, the edges of which are closely joined together. The only remaining elements of the skin to be mentioned is the outermost or superficial layer of pigment cells just beneath the epidermis. The most superficial blood vascular plexus is in close relation to this outer stratum of pigment cells; these frequently extend over the sides of the glands immediately overlying their coat of smooth muscular cells. In densely pigmented regions the pigment cells frequently form a reticulum under the epidermis and over the glands, the processes of the cells loaded with pigment granules blending so as to produce the appearance of a fabric with irregular meshes, this meshwork being depressed at close intervals in the form of a minute reticulate sack into which a gland depends in each instance.

The walls of the glands in sections are composed of clear cubical cells containing a bright nucleus and two or more nucleoli.

This description is drawn from the appearance presented by sections of the skin of the common edible frog of the United States, *Rana catesbiana*, and from the writer's observations upon other forms; the account given applies in general terms to a great many other batrachian forms.

2. The next group (Reptilia) does not possess epidermal glands except in a few instances, over a few very limited areas of the integument. The discussion of their integument in this connection would therefore be of no interest, since the integumentary glands have for the most part been lost or suppressed.

3. In the birds, or Aves, with the exception of the oil gland on the tail, there are no integumentary glands which can be compared with those of the Batrachia.

4. In the Mammalia the case is very different, for in this group we again for the first time encounter epidermal glandular structures which may be legitimately compared with those in the Batrachia. Aside from the modifications which have resulted from the specialization of the different layers of the mammalian integument, the only difference which the sweat glands of the latter present in comparison with the epidermal glands of Batrachia are such as may be ascribed to the farther development or progressive evolution of a type of integumentary gland in all structural respects essentially similar to the skin glands of the last-mentioned group. In the next place, the majority of the Mammalia possess integumentary glands which are scattered over the whole of the body. In this respect the Batrachia and mammals are the only forms which essentially agree in the distribution of their integumentary glandular organs other than the mammary, and a few others found in the latter group. The absolute want of a generally distributed integumentary glandular system in the two great groups of Reptilia and Aves proves that the phyletic history of these two series is very old, and perhaps almost or quite coeval with that of the Mammalia. It is almost equally certain that the three series, Reptilia, Aves and Mammalia, have had a common remote aquatic ancestry, and that the oldest members of that ancestral series had the integuments defended by goblet cells, followed by a succession of forms in which flask-shaped integumentary glandular organs were developed. Are the existing Batrachia representatives of that series which possessed the simple flask-shaped integumentary glands? Were the *Theromora* provided with simple saccular integumentary glands? These are questions still to be answered. From all that we know of the integuments of the primitive types of vertebrates, we may assume, with every assurance of the legitimacy of the deduction, that both Reptilia and Aves have probably lost the integumentary glands corresponding to the sweat glands of Mammalia.

In the Mammalia the sweat glands are characterized by the differentiation of a long tubular efferent duct, which has a slightly spiral direction, which becomes more marked where the outer portion of the duct passes through the stratum corneum of the epidermis. At the other end, the simple tubular and properly glandular portion of the gland usually lies in a close coil invested by a plexus of capillary vessels. Or this deep-lying glandular portion may not be so closely coiled, but extend as open loops or irregular bends amongst masses of areolar and connective tissue, as may be well seen in the sweat glands of the ball of the foot of the domestic cat, though here, as in other forms, the relation to the blood vessels is the same. In all these cases, however, there is essentially the same structure, namely, a lining secretory epithelium and an investment of longitudinally disposed unstriped muscular fibres, an arrangement which can be compared only with the arrangement of the tissues making up the far simpler integumentary glands of the Batrachia.

If we now turn to the Batrachia in quest of integumentary glands which bear a still greater resemblance to the sudoriferous or sweat glands of Mammalia, we find them on the balls of the toes and integumentary thickenings of the footpads of certain *Salientia*. Integumentary glands with a long duct and a short tubular secretory portion have been described by F. Leydig* from the tips of the digits of *Bufo*, *Pelobates*, etc. The structure of these organs, moreover, corresponds exactly to that of a very immature or embryonic sweat gland which has become provided with a duct or has acquired a lumen. They have the same lining of secretory cells in the deeper glandular portion covered by longitudinal muscular fibres. They have already acquired a long non-glandular efferent duct, which is evidently homologous, so far as structural details are concerned, with the efferent ducts of the sweat glands of mammals.

In the light of all the evidence now at our command, the following conclusions seem to me to be warranted :

1. That the integumentary glands of Batrachia and the sweat glands of mammals have had at least a common ancestral origin.

2. The method by which an integumentary gland as simple as that of the Batrachia might become converted into a sudoriferous gland would involve, in the first place, a comparatively slight change of function, and, in the second place, simple elongation in the direction of its own axis and the differentiation of an outer non-secretory portion serving as a duct and a deeper glandular portion. Some of the steps in this process have been alluded to, and it only remains for us to suppose that as a result partly of the great thickening of the epidermis in mammals that the efferent ducts have acquired greater length while the simple tubular glandular portion has simply grown in length and become pressed into a close coil, as its functional importance became greater.

3. That the *Theromora* may have possessed integumentary glands, seems not unlikely from the fact that they are believed by Prof. Cope to be the most batrachian-like reptiles.

4. It is equally probable that, with the change of habit from that of a water and moisture-loving animal to one of terrestrial habits, the primary form of integumentary gland would undergo important functional changes or adaptations, as great or greater than the change in form of the gland.

5. The principal change in the character of the integumentary glands is in their form. They pass gradually from a rounded globular form in lower types to a more elongate tubular and even much coiled form in the higher types, while preserving essentially the same morphological structure. The writer therefore believes that there is no escape from the conclusion that the comparatively complex sudoriferous glands of higher types have arisen by differentiation from the simpler defensive or poison-secreting, integumentary glands of some lower type in which they closely resembled those of the living Batrachia.

* Ueber den Bau der Zehen bei Batrachiern und die Bedeutung des Fersenknöchens. *Morph. Jahrb.*, II, 1876, pp. 165-190, Pl. VIII-XI.

Proofs of the Effects of Habitual Use in the Modification of Animal Organisms.

By Prof. John A. Ryder.

(Read before the American Philosophical Society, October 18, 1889.)

Much has been written in regard to the supposed effects of use in inducing more or less permanent and inheritable alterations in the structure of animal forms. Darwin lays stress upon the effects of disuse in weakening the muscles which control the movements of the ears. He supposes, on the ground of disuse, that the drooping ears of the many domesticated races and species of mammals may have thus arisen. He also urges the same argument to account for the poorly developed and almost abortive eyes of moles and certain rodents. To decreased use he attributes the origin of the lighter wing-bones of domesticated races of ducks, while their relatively stronger leg-bones he attributes to increased use. He also supposes that the increased dimensions of the udders of cows and goats are partly to be attributed to the effects of unwonted and more prolonged use when bred from generation to generation for purposes of milking. He also cites approvingly the results of the experiments of Ranke, who showed that the flow of blood is greatly increased towards any part which is performing work, and again sinks or diminishes in amount when the part is at rest, concluding that, if the work is frequently recurrent, the vessels increase in size and the part is better nourished. From the frequent reference to the effects of use and disuse and his evident belief that such effects were inherited, it is clear that Mr. Darwin attached great importance to use and disuse as an agent in modifying species. In so far as Mr. Darwin appealed to the effects of use and disuse he followed the lead and accepted some of the conclusions of his great predecessor, Lamarck, who had published his own views more than fifty years before the appearance of the "Origin of Species."

Lately much activity has been manifested by the German biologists, under the leadership of Prof. Weismann, in testing the effects of the inheritance of mutilations in reference to the question of use and disuse. It is the opinion of the present writer that the method of experimentation resorted to by Weismann is altogether unsatisfactory, since the mutilations in the first place were made upon parts which were not only already rudimentary, but also after the ontogenetic processes had been practically completed. Weismann practiced the excision of the tails of mice in a series of successive generations without any inherited result, and forthwith concludes that mutilations are not inherited. This negative evidence, based on experiments in mutilating mice, is of absolutely no value whatever in solving the problem of the effects of use and disuse now before the present generation of biological investigators, as I hope to show

in the near future. One may be still more sweeping and even offer good reasons for the assertion that there is not now upon record a single instance of structural modification due to mutilation which has been even adequately traced or studied by the help of the rigorously exact ontogenetic method. Experiments in mutilating a few successive generations of mice are of no value in deciding this question, first, partly for the reasons already assigned, and, secondly, because there were not enough successive generations experimented upon, and, thirdly, because there is but little direct evidence to prove that structural alterations resulting through *external* mutilation are inherited. To hold up the results of such experiments as conclusive evidence against what are claimed to be the erroneous views and grounds of opinion of Lamarck and his followers may be regarded as scientific amongst Neo-Darwinists, but as a good old-fashioned Lamarckian such a proceeding appears to me just the reverse.

The evidence as to the effects of use in the modification of species was very meagre in Lamarck's time, and but little evidence of a conclusive character has been accumulated since, as is proved by the paucity of examples cited even by Darwin himself. Even the cases of the dung-beetles, where the tarsi of the anterior legs are completely lost in *Ateuchus*, the sacred beetle, the evidence that their absence is due to the inheritance of their very frequent loss through mutilation is uncertain. The only case where a mutilation seems to have been inherited is, as the writer first pointed out, that of the imperfect enamel crowns of the embryos of white rats studied by Von Brunn. In these cases the imperfection of the enamel coverings in the just erupting molars corresponded exactly to the enamel areas worn off through use at the tips of the crowns in the molars of the adults.

While it is impossible to subscribe to much that has been offered as explanatory of structural modification through use alone, there are many instances of structures the origin of which is to be accounted for in no other way. The crude hypothesis of Herbert Spencer ("Prin. Biology," ii, Chap. xv), as to the method of evolution of the vertebral column, while far better than the transcendental speculations of Owen respecting the general homologies of the vertebral bodies, with their appendages, can now be replaced with a far better one. While it remains true, as Spencer points out, that the segmentation of the vertebral axis is due, as even Rathke and Balfour recognized, to the mechanical requirements of such an axis and the conditions of growth under which it is placed, the details of this process have not even yet been fully worked out. In order to do so the vertebral axis of every distinct type must be critically investigated; the processes of the ontogeny of every one of its elements, no matter how minute, not simply its ontogeny, must be traced before comparisons and deductions are in order. Over a year ago the present writer took up anew the general subject of the vertebral column throughout the vertebrate series, with the result of finding that this structure is an example of continuous evolution as supposed by Herbert Spencer, in his article entitled

“*A Criticism on Prof. Owen’s Theory of the Vertebrate Skeleton,*” and published in the *British and Foreign Medico-Chirurgical Review* for October, 1858. I find that it is possible on the basis of fact to completely substantiate, so far as the vertebral column is concerned, Mr. Spencer’s conclusion, stated near the close of the article just cited, that: “It is a perfectly tenable supposition that all higher vertebrate forms have arisen by the *superposing of adaptations upon adaptations.*”

I find in fact that not only have the successively higher and higher types of vertebral elements grown out of one another in succession as the consequence of superimposition of new characters, but also that as a result of such superimpositions of new features a complex series of substitutions have resulted, which it is not in place to discuss in detail in this connection. It may be demonstrated that the growth and evolution of the jointed calcified vertebral column, after the development of the notochord was achieved and upon which the first expression of a segmented support was moulded, could take place in only one way, in forms with a free larval stage or such as developed quickly into an active organism, followed by a prolonged period of growth. It may also be proved that the only jointed calcified structure which could here satisfy the requirements of rapid, tridimensional, continuous growth in such a case without entailing inefficiency was the biconcave type of vertebræ, which are thus found to have a profound physiological and adaptive significance which has never hitherto been even dreamt of by the ordinary “*Ding an Sich*” school of morphologists, the offspring of the one-sided training now practiced in all European and American biological laboratories, in which the microscope, microtome and homologues, real or fancied, are the reigning fetishes. It may be shown also that the development of the vertebral bodies under such conditions is exogenous; that the mechanical conditions, definite motions and space relations of the parts involved are the determining factors in the evolution of a definitely-shaped succession of segments moulded upon a preëxisting notochordal rod. It may also be shown that, as layer after layer of new matter is superimposed upon the first trace of a vertebral body, these layers become successively wider and wider, and that the last formed or youngest and most external layers are the only ones which articulate by their edges and form the points of contact of the ends of the cylindrical vertebral bodies. It is thus easy to understand that, with every increment of growth, a new articulation is established between every two successive vertebræ, and that at the same time the innermost and first annular rings of calcified vertebral substance of successive vertebræ are pushed as much farther apart as the new rings at the periphery have grown in additional width. Thus arises that marvelously ingenious yet extremely simple form of calcified vertebral body which not only furnishes the means of continuous growth, but also that of continuous functional activity.

It may also be rendered certain that it is such a biconcave form of vertebral body which forms the basis out of which all the others have

grown. It may be shown that traces of the more primitive biconcave matrix of the vertebral body are embedded within the cartilaginous or even osseous matrix of the later stages as seen in some Batrachia and reptiles. It may also be shown that the epiphyses of the centra of higher types have their cartilaginous bases developed as ingrowing proliferations from the cartilage formed outside of the more primordial calcifying matrix which is broken or interrupted into a regular succession of recurring rings by the flexures of the body induced by the muscles during locomotion. This process of cartilaginous invasion begins to show itself in the very lowest of the true fishes or Lyrifera, viz., *Chimæra*.

There has been not even a partial abandonment of the primordial method of development of the vertebral bodies until we meet with forms which undergo a prolonged and complete development *in ovo* or *in utero*. There has, therefore, been no deviation from the primitive method of evolution of the calcified, flexible, jointed vertebral column until forms are reached in which specialization is so extreme as to require as an absolute physiological necessity an abbreviation of the processes of development of the column. Yet even in the most abbreviated form of development, as seen in Mammalia, including man, unmistakable traces are left over of the once biconcave condition of the vertebral segments. It may be shown that the physiological, histological, chemical, physical and mechanical conditions render the biconcave vertebral body the only one which is possible in the primitive condition; it therefore follows that there was no natural selection possible after the notochord was formed. There was only one groove, so to speak, along which the progressive evolution of the segmented, calcified, vertebral axis of vertebrates could proceed. There was no turning back once the notochord or vertebral matrix had been formed. The advent of the notochord "ordained the becoming," to borrow a phrase from Owen, of the future jointed column, and all the variations of the latter as manifested in species are the mere expressions of adaptive by-play. The same grounds are taken by Geddes in the discussion of the evolution of epigyny through perigyny and hypogyny in flowering plants.

Natural selection has therefore had absolutely nothing to do with the genesis of the primordial type from which all vertebral axes are evolved. At most the action of natural selection must be extremely indirect, and could in no way be operative except through the notochord, which may be shown to be a modified derivative of the intestinal wall of the same histological nature as the cellular axial cords of the tentacles of Hydrozoa and Scyphozoa. If it is possible to exclude natural selection it is also possible in a great measure to exclude the effects of inheritance. If it can be shown that the only thinkable or conceivable method of evolution of a jointed yet calcified and flexible vertebral axis is that actually realized, how is it possible to prove that inheritance even has anything to do with its development beyond providing for the ontogenetic recapitulation of its cellular matrix, the notochord and the arrangement of the muscles in a

series of lateral pairs, capable of effecting only one movement, which is itself the expression of an adjustment which it is impossible to prove first arose in any other way than as the result of obtaining the greatest physical effect in moving the body most efficiently through the water with only one kind of recurring and alternating muscular contractions happening on opposite sides of the body. Just here the natural selectionist jumps to his feet and declares, "There, you have granted all that we claim." But not so fast; wait a moment. It is competent for him to first prove that this simple muscular training does not increase or stimulate the development of muscle through further histological and morphological differentiation and cell-multiplication, and the subsequent inheritance of this acquired complication and increased strength through use. Since there has not yet been offered an iota of conclusive evidence to the contrary, and, since the necessary investigations have not yet been made to disprove my position, I insist upon remaining an absolutely orthodox Lamarckian.

There are still other reasons for taking the above-stated position, which cannot now be referred to except briefly, as they arise from a consideration of the far more intricate and difficult question of sexuality. The greater part of the recent discussions of the significance and origin of sexuality are so transcendental in their character as to promise little of permanent value, since all of the hypotheses yet propounded, with the exception of the two radically different views propounded by Patrick Geddes and myself, overlook the importance and necessity of keeping in sight the general physical doctrine of the conservation of energy. No biologist has yet recognized with sufficient clearness the overwhelming importance of the principle of overnutrition, which was at once the cause of sexuality, the struggle for existence and the direct means of the evolution of all larval forms. Overnutrition, resulting in sexuality, was the means of heaping up potential physiological energy in the egg so as to render larval development and a larval struggle for existence a possibility; and any other view of the origin of all or most larval types has little or no scientific warrant in fact. If, therefore, physiological energy was superimposed upon physiological energy or potentially stored, so to speak, in a germ-cell of exaggerated dimensions, it follows that the main-spring of evolution or its motive force is to be sought in sexuality and not in the Weismannian speculations as to the significance of one or two polar cells or the existence of a hypothetical germ-plasma which amounts in essence only to a restatement of the fact of heredity to which a hypothetical-physical basis is thus assigned. Since it can be proved that larval adaptations have occurred independently and wholly regardless of the attained differentiation of the parent, the fallacy of Weismann's doctrine of the immortality of the germ-plasma must be sufficiently obvious to those who have followed him in the development of his extraordinary errors.

I wish it to be distinctly understood that I do not consider all evolution as mechanical, but I do wish to be understood that the processes of evolution are physical and must ultimately be treated as physical problems.

To the elucidation of some of the grounds upon which hypotheses of mechanical evolution may be founded I have steadily devoted attention since 1877, in the belief, then, as now, that the only hope of the solution of many of the problems presented by the phenomena of adaptation lay in the direction sketched out in my first considerable essay, entitled, "On the Mechanical Genesis of Tooth Forms," published in the latter part of 1878. That essay met with no recognition amongst biologists except at the hands of my distinguished friend, Prof. Cope. In England, a deservedly well-known odontologist dismissed it, in a work on dental anatomy, with a characteristic British sneer and with comments that showed that he had not only not read it, but that he had also utterly failed to understand the grounds upon which my speculations were based. That line of odontological study has since been most profitably followed out in much greater detail by Profs. Cope and Osborn, but there are other and more definite proofs needed. Since the hard parts of animals are moulded by the soft parts, and not *vice versa*, what is now required is some evidence in the first place that hard parts do in reality suffer modification, through the influence of the actions of an animal, and that Lamarck's theory of use proves true, as happens in the case of several thousand species of fishes now living, notwithstanding the objections so glibly urged off-hand by biologists whose special studies unfit them to express an opinion upon this subject.

The cases usually appealed to to prove the modifying effects of use are too complex, and the history of their parts is not always well enough known to afford conclusive evidence. In the series of cases now to be presented this is not the case. The entire history of the parts, directly affected by an exceedingly simple mode of use, is known from their earliest appearance until the completion of growth. The embryological, morphological and physiological sides of the question are therefore adequately represented in a simple case, and all that remains is to trace the kinetic side of the subject, or that involving the expenditure of energy, in order to complete the physical survey of the problem.

I have been aware for upwards of ten years that it is probable that the numerous transverse fractures in the so-called jointed or "soft rays" of fishes had probably arisen as the result of the interaction of the living fish and its surroundings. Only within a very recent period, however, has it been possible for me to find evidence, which I believe to be incontrovertible, in proof of such a conclusion. This evidence serves to demonstrate conclusively that Nature may and does make truly morphogenetic experiments if we will but pursue her clues until she is literally taken in the act of creating new features. As far as I am aware, the case about to be described is the first one that has been recorded that serves as direct proof of the doctrine that the structure of an organism may be altered by the actions of the organism itself.

The proof that the "soft rays" of fishes are normally fractured and more or less completely segmented by the resultant interaction between

the fins when in functional use, and the resistance offered by the surrounding water in which the animal swims, is based upon a single series of facts observed in the tails of young trout from a little less than, to somewhat more than an inch in length. In young trout that have just completed the absorption of their yelk sacks, it is found that the outer rays of the caudal fin are segmented in a direction different from that observed in the median rays, as shown in Fig. 1. This figure shows that the outer or extreme dorsal and ventral rays are fractured obliquely, while the median rays are broken or fractured in an exactly transverse direction. The obliquity of the fractures of the extreme dorsal rays is also exactly the reverse of those of the extreme ventral rays, so that the lines of fracture lie approximately parallel to an imaginary vertical line drawn up and down over the side of the whole fin.

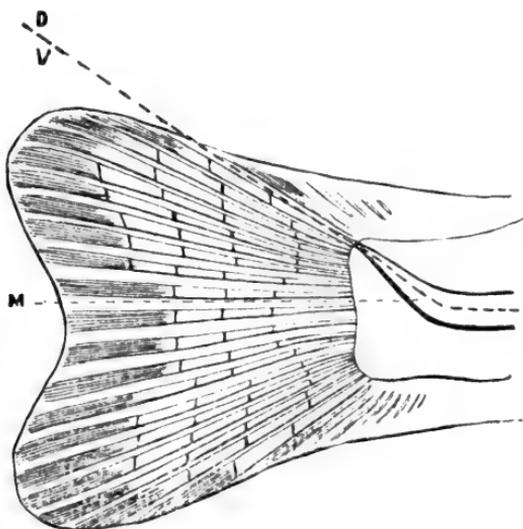


FIG. 1.

Now, what is the significance of these facts? In the first place, that the fractures are real physical breaks which are caused as the consequences of overcoming resistance is shown by the ragged, bruised appearance of the broken ends of the segments, and by the appearance of new breaks between those first formed as the fin-rays become longer and stronger, as the fish grows in size, until as many as two hundred or more may be formed in the course of each of the lateral halves of a single ray. Obviously, the only movements which are effective in bringing the tail into use as an organ of propulsion, are the vibratory movements from side to side, with which every one is familiar who has ever seen a fish swim. In so using the tail the resistance offered by the water is that which must be

offered to a flat vertical membrane supported by rays diverging radially from the hypural bones or cartilages below the upturned urostyle or notochord. Motion is mainly imparted to the caudal fin by the muscles of the urosome, or by that part of the tail of the fish intervening between the base of the caudal fin and the anus. The motion of the caudal fin is therefore controlled by the posterior part of the vertebral column and the lateral muscles of the urosome, and not through the morphological axis represented by a dotted line deflected upward and terminating between the letters D and V, so that the mechanical axis, or the axis which controls the movements of the whole fin, passes out far below the latter along the dotted line ending at M. The consequences are obvious; the resistance offered by the water to the motion of such an osseous framework of diverging rays is such as to break the median ones square across and those slightly below or above the mechanical axis in a slightly oblique direction, while the long rays at the extreme dorsal and ventral margins of the fin are actually broken across at an angle of nearly 45° with their own axis. If any other valid interpretation of the origin of the differences in the direction of the fractures or joints of the fin-rays of the caudal fin can be proposed, I should be glad to hear of them. But it is inconceivable that any other can be true.

While what is regarded as conclusive proof of the modification of hard parts, conformably to the operation of purely physical agencies has been offered above, it still remains to prove that the forms of soft parts are so modified. That this may be done is already evident from the data in my possession in regard to the modifications entailed upon larval stages which undergo specialized modes of development in the egg or reproductive passages of the female parent. If it can be shown that larval stages are structurally modified by physical agencies, it is tantamount to certain that the adult is not exempt from the influence of such agencies. Consequently the old debate as to the effect of use and disuse, and the interpretation of adaptations and inheritance on the basis laid down by Lamarck just eighty years ago, has not yet been disposed of, nor will it be by the fundamentally erroneous methods now almost universally employed by those biological investigators who take the opposite grounds.

In Fig. 2, the heavy curved or wavy lines drawn across the outline of the caudal fin show that the breaks, while practically conforming to a direction parallel to an ideal vertical line drawn across the whole fin, the individual breaks of the separate adjacent rays change position slightly with respect to such a vertical. If lines are now drawn through the transverse rows of breaks of the successive rays we obtain three lines symmetrically related to the mechanical axis of the fin. Three of these lines correspond to the three complete transverse lines of breaks or fractures, while the fourth is not yet complete, but enough of it is shown to prove that when complete it will conform to those in front of it. These major curved lines to which the lines of fracture of all the caudal rays conform, also themselves conform approximately to the outlines of the pro-

files of the successive myotomes, or lateral or muscular segments of the urosome when viewed from the side. These further correspondences and curves are not insignificant. They are undoubtedly to be traced to the

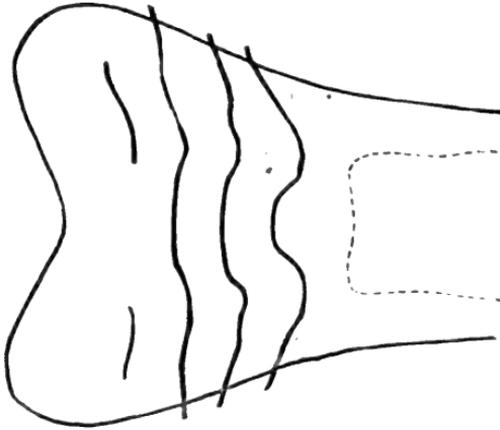


FIG. 2.

properties of strength at different points of the material fractured and the way in which the energy of motion exhibited by the myotomes of the lateral muscles of the tail is exerted upon rays lying at different levels in the caudal fin.

It may be stated that these figures are from actual camera drawings of the objects themselves, and that no liberties whatever have been taken in recording the facts, as permanent preparations in my possession will testify.

A study of the other fins of young fishes discloses the fact that the soft rays in the dorsal, anal, pectorals and ventrals are fractured in conformity with the exigencies of use. A study of the types of orders shows that wherever the "soft rays" occur their transverse fractures are due to the same cause; sometimes even pseudo-artrodial articulations may thus result. The final conclusion is that the fractures of the "soft rays" of the fins of some six thousand species of fishes now living are the direct results of use. Disuse of the fins would result in absolutely depriving all this host of forms of one of their most salient characters. Whether the effects thus mechanically produced anew in the course of the life of every generation are inherited, is a matter of no consequence, since there is no need in this case for an appeal to the influence of heredity.

A Physiological Theory of the Calcification of the Skeleton.

By Prof. John A. Ryder.

(Read before the American Philosophical Society, November 1, 1889.)

The well-known researches of Harting, Rainey (1858), and Ord (1879) on the interference exerted by the physical properties of colloids in modifying the form of crystalline bodies left to crystallize therein, may afford the basis for an interpretation of the processes attending the genesis of the calcareous skeleton in many living forms. Especially is this true if we keep in view the significance of the indifferent intercellular colloids normally produced at certain places in the living organism, and their comparative passivity with reference to all of the metabolic processes going on in the surrounding active or cellular tissues. The substances which, when isolated, as Collagen, Elastin, Chondrigen, Chondrin, etc., represent in a separate form the basis of the non-cellular, passive and supporting structures or skeletal elements which serve as points of attachment for the apparatus of motion, the muscular system. These materials, which are essentially of intercellular origin, represent the colloidal or fibro-laminar matrix of bone and cartilage throughout the vertebrates, in which calcareous matters are thrown down and retained, so as to give more or less firmness or rigidity; or, as a firm jelly, as in the case of cartilage, in which cells are imbedded, a certain rigidity is attained through the molecular stability and cohesion of the structures so formed, as in bars of cartilage, for example.

The one series of features which characterizes these bodies is their intercellular origin, their homogeneity and molecular stability or inactivity. They therefore stand in the most extreme contrast with respect to their physical properties when the latter are compared with the other active, living cellular tissues of the organized bodies in which they are found. While all of the living cells of the organism exhibit an active metabolism, the non-cellular supporting tissues, such as the white fibrous, yellow elastic and cartilaginous, cannot of themselves exhibit anything of the sort, but only through the intermediation of the vascular and other tissues is such metabolism possible. Cartilage is usually not traversed by vessels, and is never richly vascular, though it may give passage to a few widely scattered vessels, as happens in some of the cranial cartilages of the sturgeons. As a rule, the presence of vessels in cartilage carries the implication that they have grown into the cartilage secondarily; myeloplaxes or other amœbiform cells have eroded the cartilage in advance of the ingrowing vessel. In the highest types of bone development, as met with in mammals, birds, reptiles and Amphibia, this is the way in which the cartilage is removed from the centres of long bones, after it has served its purpose as a matrix upon which the forms of the permanent skeletal elements have been moulded in the form of the firmer and more stable substance which

eventually forms the matrix of the calcified skeleton of the adult. This new matrix, after the hollowing-out process has been accomplished by the agency of the ingrowth of the blood vessels and amœbiform osteoclastic cells into the cartilage, is deposited not only within the bone but also on its outside; at first the amœbiform cells, which now begin to be included within it, as the bone substance grows in thickness, are known as osteoblasts, and are joined together by fine protoplasmic processes and to the lymph and blood spaces which have been eroded by the latter within the bone substance. In this way an elaborate metabolic cycle is established with the blood vascular system in which the fine protoplasmic threads, joining the bone cells into an almost infinitesimally fine reticulum, are the ultimate ramifications, while the system of blood and lymphatic vessels are the gross bonds through which the whole is brought into relation and continuity with the general metabolism of the body.

The ultimate ramifications of the vessels through the adult bony tissue are known as the Haversian canals and the canals of Volkmann. The bony matrix around the former is concentrically laminated, around the latter it is not. In the very young of higher animals, such as a child under a year old, the bony tissue does not exhibit the lamination around the Haversian canals such as it shows in the bones of the adult. This interesting fact is confirmed by the structure of the bones of fishes, in which there may not even be osteoblasts present within a bone at any period of the life of the animal; the bones being in reality nothing but absolutely homogeneous or laminated plates of a matrix which has calcified throughout. The matrix in this case, as in all the others, has been deposited by the action of connective-tissue cells and vessels, and both of these may be observed in the vicinity but lying external to the bone matrix. In other cases an elaborate reticular calcifying matrix is developed within cartilage without the presence of vessels. The most singular type of this is that met with in the vertebral centra of sharks, where the radiating and concentric fibres of the calcifying matrix arise between the cartilage cells which formed the primary or embryonic vertebral body. The radiating fibres, in this case, may be traced as continuations into the fibrous connective tissues investing the vertebral column. This matrix is homogeneous, highly refringent and its origin may be traced in the embryo directly to the *membrana elastica externa* of authors.

The non-vascular character of all the tissues of animals immediately involved in calcification has been thus well established. The only vessels which can be identified as actually perforating as the minutest canals either bone matrix or cartilage are the canaliculi from the lacunæ in which the bone and cartilage cells lie. The comparatively coarse capillaries of the Haversian systems are remnants of the erosive and constructive processes which took place when the bone was built up during ontogeny. They become narrower and more constricted as life advances, and the bones become more solidified. It is therefore obvious that the processes of metabolism are here normally at a very low ebb so far as they affect the

bony tissues proper. The matrix being firm and stable there is no close and continuous union with the vascular system except by way of the network of processes of the so-called osteoblasts or "bone-forming cells," which indirectly form one system with the Haversian systems of blood and lymph vessels in the higher types. In the lower types and in embryos this is not the case; the bone matrix as a plate or delicate reticulum (vertebræ of sharks) calcifies without even the presence of so-called osteoblasts embedded in its substance. The calcification of the homogeneous concentrically laminated cysts, containing parasitic *Trichinæ* in infested muscle, the cysts being the result of the defensive action of the connective tissues and vessels against the parasites, is surely proof that calcification is a physical process determined merely by the presence of an ametabolic or stable colloidal matrix, which is capable of taking up calcareous or other earthy salts, the latter losing their crystalline characteristics more or less completely, owing to the physical interference of the colloid in the processes of crystallization.

In young sharks, eight inches long, the lower jaw is instructive in this connection. Cross sections of it show that the calcareous salts have been deposited on the superficial layers of the matrix of Meckel's cartilage as irregular nodules, many of which recall some of Rainey's figures of crystalloids formed in artificially prepared and calcareously saturated colloids. These nodules in the young shark's jaw are, moreover, nearest the surface of the cartilage or nearest the vascular source of calcareous deposit. In developing bone the same holds true. It is in the middle or diaphysial part of the cartilage of a foetal long bone in which endocartilaginous calcareous deposits are first to be observed, or in the oldest part of the cartilage or that in which the colloidal matrix has had the most time in which to passively take up such materials. Later this calcareous material is again absorbed when the cartilage of the shaft is eroded and destroyed by the ingrowth of the blood-vessels, at the time the formation of the matrix of the true bone is to begin.

Summing up the whole of this evidence, we are fully warranted in drawing the following inferences:

1. That a dense homogeneous, a metabolic or passive colloidal matrix, whether found within or without a living body, will tend to abstract and precipitate within itself, in the form of nodules or granules, any calcareous salts with which it may be mixed or by which it is bathed.
2. That the density of these colloidal matrices greatly increases their avidity for calcareous matters, so as to cause them to very soon become completely saturated with the calcareous salts so as to appear homogeneous, and characterized by a mineral-like brittleness, as in the laminar bones of fishes, without included osteoblasts, or as happens in the case of the dense matrix of the true bone tissues of higher animals.
3. That the firmness and persistency of the bones of higher forms are due to the presence of their matrix of collagen-like material to and through which the calcareous materials are being continually brought by the

blood and lymph vessels of the marrow and periosteum, to be absorbed and carried to all parts of the thick bone substance by the processes of the bone cells or osteoblasts.

4. That the avidity of the absorption of calcareous matter is proportional to the density of the colloidal matrix, and that the gradually increasing brittleness of bone, as age advances, is due to such increasing density of the matrix and its still more enfeebled and less active metabolism.

5. That the feebleness of the metabolism going on in bony tissue or matrices is the main cause, together with their avidity for earthy salts in solution in the fluids of the body, of the rapid calcification of young bones as well as of the persistence of their calcified condition throughout life.

6. There are no such things as "bone cells" or "osteoblasts" in the sense of makers of bone; these cells play an absolutely intermediary rôle in bone formation, since they only give rise to the bone matrix, and form a network in the highest forms of bone by which a bond of union is established throughout its substance, serving for the transmission of calcareous salts from one part to another. The absorption and retention of calcareous matter by bones is a physical process, conditioned by the establishment and circumscription of colloidal or homogeneous stable matrices at definite points in the organism; these loci in turn are determined by the soft parts through inheritance.

7. The soft parts have determined, in the main, the shapes of the hard parts of the endoskeleton, and not *vice versa*, with the exception only of the teeth.

The earliest form of a colloidal non-cellular matrix is found in the umbrella of *Medusæ*, of both hydrozoan and scyphozoan types. It here confers an elasticity to the umbrella which is sufficient to effect the recoil of its margins when the animal is in motion. In other words, the systole of the umbrella is effected by the marginal radial and circular muscles, its diastole or recoil is due to the elasticity of the mass of elastic more or less colloidal matter interposed between the epiblast or ectoderm and the hypoblast or endoderm. Its function is here not only that of a supporting endoskeleton which gives the umbrella its configuration, but also effects the diastole of the umbrella without involving any extra expenditure of energy through its own metabolism, as must happen in contracting muscle.

This gelatinoid matrix is a secretion of the primary embryonic layers and plays an important rôle in giving form or configuration and a certain rigidity to many larval forms. It is therefore physiologically the oldest of all endoskeletal structures.

The next element of the endoskeleton which is of equally great significance in the elaboration of a theory of the genesis of the vertebrate endoskeleton are the axial cellular cords of the tentacles of many *Hydrozoa* and *Scyphozoa*, the oral rods and axial supports of the cirri of *Branchiostoma*, and the notochord of all vertebrates, ascidians and Hemichordata. Prob-

ably the vesicular connective tissue of mollusks falls into the same category.

The common character of all these types of tissue is the development of cavities in its cells filled with fluid. All, except the last, also seem to have lost the power of storing up plasma, and the plasmic cell walls become thin and the nucleus is either pushed into a parietal position and adherent to or embedded in the cell wall, as in the notochordal tissue, or the nucleus is suspended by plasmic threads running radially from the plasma which invests it to the attenuated wall of the vesicular cell.

A mass or cord of such cellular tissue also possesses certain elastic properties as a result of which it may not only give form but also save the expenditure of energy in the same way as we have already seen in the case of the gelatinous matter of the umbrella of *Medusæ*. Its elasticity probably serves to automatically straighten out the body in young fishes or those in which the notochord is persistent, and thus saves the expenditure of a great amount of energy through the metabolism of muscle. In fact it is almost absolutely certain that the notochord of embryonic vertebrates has the elastic properties which I ascribe to it, judging from the phenomena exhibited while such embryos are dying under actual observation. It is a truly cellular supporting tissue in contradistinction to the jelly-like matrix which makes up most of the sometimes slightly fibrous substance of the umbrella of *Medusæ*.

The elastic properties of notochordal and other vesicular supporting tissues do not arise as in the gelatinoid non-cellular supporting matrix from an inherent elastic property such as would be met with in a mass of rubber or a jelly prepared from gelatin, but from the qualities arising from a cord or mass of minute cellular vesicles, with rather firm walls, bound together by intercellular substances and external cuticular and intercellular membranes, investing such an aggregate of hollow cells. Such a mechanical aggregate possesses somewhat the properties of erectile tissue, the qualities of which depend upon turgescence. In the latter case it is temporary vascular turgescence under the control of the nervous system, and consequently involves the expenditure of energy through metabolism, both nervous and muscular, whereas in the former case the permanent erection of the tissue is due to the permanent turgescence of the tensely filled individual cells and calls for apparently no expenditure of energy.

Another property of such vesicular tissues is their passivity or metabolic indifference, which is obvious from simple inspection. This indifference or metabolic passivity is also exhibited *en masse*, since there is invariably a tendency to form more or less homogeneous fibrous or dense cuticular membranes around such masses or cords of cells. This is the expression in the living normal organism of the same phenomenon as the deposition of a cuticular capsule around a sliver or bullet which has penetrated and become permanently embedded in the comparatively indifferent or passive connective tissues of a higher animal, or the deposition of a cuticular laminated capsule around *Trichinæ* lying between muscular

fibres, or the young trematode which has bored as a *Cercaria* into the corium of a fish and there become encapsuled.

It will be seen later that these facts have a profound significance as respects the genesis of the endoskeleton met with in many mollusks, ascidians, balanoglossus and vertebrates.

In the vertebrates the first intimations of cartilage are met with in *Branchiostoma* around the notochord, but not as definite bars. The gelatinoid matter for the matrix appears to be present around and between the notochord and the muscle plates and in the epipleural folds, but no definite loose cell aggregations have as yet wandered into it to constitute true cartilage. No true cartilage, in fact, exists in *Branchiostoma*, only the materials and possibilities of it.

In marsipobranchs the neural and hæmal arches are developed around the anterior part of the notochordal axis only, and these elements here present the character of a tissue of cartilage cells embedded in a dense fibrous matrix the origin of which is, however, to be traced to a homogeneous circumnotochordal gelatinoid matrix such as is seen investing the notochord of *Branchiostoma*.

The next step in advance is made through the chimæroids and sturgeons, in which the cartilaginous arches are developed for nearly or quite the entire length of the notochord. From this point onward the cartilage begins to preponderate around the notochord, and as we rise in the vertebrate scale the neural and hæmal arches, where they abut against the notochord, expand in all directions as flat disks, so as to form a more or less complete investment around the notochord. Eventually in birds and mammals, the cartilage precociously replaces the notochord, and it dwindles or aborts in the embryo so that by the time the latter is hatched or born, traces only of the notochord remain within and between the centra.

The axial intermuscular tissue in the extremities of higher types seems to have given rise, in the same way as above described, to the cartilaginous matrix of the limb-bones. In *Branchiostoma* traces of continuations of the gelatinoid intermuscular substance is found in the epipleural folds. In the true vertebrates cords of proliferated cells in the axis of the limb (prochondral cells of Strasser), pour out or aggregate to themselves more and more of the primitive intermuscular and intermembranous gelatinoid matrix. Definite bars of cartilage so arise, at first unsegmented, representing the whole of the future osseous merites or segments of the limb. At first not sharply circumscribed, such bars eventually become definitely and sharply outlined and imbedded in a matrix of fibrous connective tissue, which is the perichondrium or germ of the future periosteum, in case future ossification occurs.

With circumscription of the definitely formed bars of cartilage the exudation of a still more dense deposit of homogeneous matter occurs through the instrumentality of the perichondrium. This is invariably thickest at the oldest part, or at the middle, of the shaft or diaphysis of cartilage

representing a long bone. This deposit is at first thickest around the middle of the long bones for the same reason as that already assigned for the early appearance of calcareous deposits in the middle of the diaphysis, viz., the greater age of this region.

In calcified bones of *Batrachia*, Kastschenko has shown that these first homogeneous deposits contain no bone corpuscles, an observation which I have confirmed, while Kölliker has lately recorded similar facts regarding the bones of very young *Mammalia*, while my own studies in fishes show that there are forms, such as the *Lyomeri*, which reach even the adult stage without including a single osteoblast in any of their calcified bones. I may further add that embryonic membrane bones of *Mammalia*, and especially of fishes, at first develop and calcify in the form of absolutely homogeneous plates or in reticuli of a dense homogeneous substance allied to collagen.

Summarizing these results still further, it may be said that :

1. The indifferent intercellular colloid or gelatinoid tissues of invertebrates and vertebrates have a labor-saving as well as a supporting function.

2. The same may be said of the indifferent or ametabolic vesicular and notochordal tissues of invertebrates and vertebrates.

3. The indifferent, ametabolic or passive qualities of both these kinds of tissues apparently leads to the throwing down of homogeneous cuticular deposits upon their surfaces by the surrounding tissues, in much the same way as indifferent foreign bodies are encapsuled by colloid laminated membranes, and which may become infiltrated with calcareous matter.

4. Osseous or calcareous infiltration of gelatinoid or colloid matrices, and of homogeneous reticuli or membranes, always begins in the oldest parts of the same, in conformity with what would be expected of them on *a priori* grounds and in view of their ametabolic physical properties.

A homogeneous membrane of collagen may give rise by intercellular extension and deposit to a reticulum consisting of the same substance. This happens in the vertebræ of sharks, where such a reticulum invades in an outward direction the investing rings of cartilage forming the bodies of the vertebræ and calcifies directly without the intermediation of the invasive or irruptive processes which accompany the formation of the cancellous tissue of the bones of many vertebrates, including *Teleosts*, *Batrachia*, *Reptilia*, *Aves*, *Mammalia*.

The cartilaginous tube investing the notochord in sharks has probably been evolved through a condition which is permanent in *Chimara*, where the cartilage at the bases of the neural and hæmal arches has begun to irrupt through the outer *membrana elastica externa* into the here enormously thickened fibrous *membrana elastica interna*. In *Teleosts* the elastic sheath in many cases seems to calcify and segment directly into the vertebral rings. In other forms the *elastica externa* is the first to calcify, even long before the cartilage of the vertebral centra. The *elastica externa* is rudimentary in *Aves*, *Reptilia* and *Mammalia*, and can be seen

only in the embryo with fine processes sometimes extending in cross sections a little distance into the here more developed hyaline matrix of the massive cartilaginous investment.

When the irruptive processes of bone formation or neoplastic ossification occur they are followed by the deposition of dense homogeneous or fibrous matrices around the marrow cavities so formed, within the original homogeneous calcareous tube, which was formed by moulding a deposit of collagen-like substance upon a matrix of cartilage. In such new homogeneous deposits new infiltrations of calcareous matter occur within and superimposed upon the old. In such endosteal deposits and in the later periosteal deposits the homogeneity of the bone substance is interrupted only by the intercalation of the osteoblasts which are left imbedded in the homogeneous matrix as the latter is laid down, layer after layer.

If time permitted, the mechanical advantages and expedients of neoplastic bone formation, as well as the intricate series of substitutions which can be traced in the evolution of the vertebrate skeleton, might be discussed in full, but my intention has been fully realized, at present, if it has been made clear that the physical, chemical and physiological properties as well as the mechanical space relations of the parts involved, must be considered in order to arrive at a sound theory of the origin of the skeleton. It is especially to be insisted upon that the physical properties of the substances involved in calcification are to be taken into account quite as much as their morphological characters, in working out a general theory of the history of the skeleton. Morphology may serve to aid in interpreting phylogenies, but it is evident from what has preceded, that morphology alone is incapable of grappling with the question of the true causes of the genesis of the skeleton, quite as much so as the overstrained hypothesis of natural selection.

NOTE.—The only portion of the skeleton of vertebrates, the matrix of which is of exoskeletal origin, is the enamel. The dentine is endoskeletal.

The elastic fibres found by Kölliker in bone, belong to the category of substances denominated colloidal. The later fibrous character of the matrix of many if not the majority of bones of higher types, as a result of which, while living and moist they have a certain elasticity, does not any the less exclude their constituent fibres from the group of colloidal substances. In the same way the homogeneous actinotrichia of the fins of fishes and their investing matrix of calcified matter is colloidal. The precipitation of calcareous matter follows these actinotrichia to the very margin of the fin folds, where they diverge more and more like the ribs of a fan, and thus give rise to the characteristic dichotomous character of the soft rays of all malacopterygian forms of fishes.

The deposition within the middle of the notochord of an axial median cord of fibrous collagen-like substance is a further instance of the slow degeneration and metabolism which may go on within even a relatively indifferent tissue. This axial cord is an intercellular deposit, and has been

frequently mistaken by anatomists for the whole of the notochord, in the intervertebral regions of the column. It is present in *Chimæra*, *Acipenser*, *Petromyzon*, *Myxine*, and traces of it are present in higher types. It may be derived from the primitive central canal of the notochord, or mark the point from whence that canal has disappeared. The partially tubular notochord of Hemichorda would countenance this view as well as the partially hollow notochord (at the caudal region) of the embryos of some birds.

The writer would here acknowledge the value and importance to him of materials kindly supplied to him from the National Museum at the instance of the obliging Director of that institution, Dr. G. Brown Goode.

On the Genus Nyctinomus and Description of Two New Species.

By Harrison Allen.

(Read before the American Philosophical Society, October 4, 1889.)

The genus *Nyctinomus* includes twenty-one species and is of cosmopolitan distribution. Thus ten species are found in Africa and Madagascar; one in Europe with a range in the northern part of Africa; two in India; two in the Malay Archipelago; one each in Polynesia and Australia, and four in America. It is interesting to contrast this wide range with that of the other two genera of the group in which *Nyctinomus* is found, namely *Cheiromeles*, which is restricted to the Indo-Malayan subregion, and *Molossus*, which is confined to tropical and subtropical America, excluding the United States. Notwithstanding the extended range of *Nyctinomus*, the species are closely related. With the exception of *N. johonensis* and *N. australis*, few specialized structures are met with; and but two species—one from Madagascar (*N. albiventer*) and a second from Africa (*N. acetabulosus*)—depart from a single formula for the teeth. As is the case with the Cheiroptera generally, the American species are the most obscure. Of the four described species, I have seen *N. brasiliensis*, *N. macrotis* and *N. gracilis*. A recent study of the materials at hand has led me to record descriptions of two new species.

NYCTINOMUS EUROPS, n. s.

Muzzle divided in middle into two parts by a vertical linear groove, the sides of which are defined by spines. These are continuous with the spines of the upper border of the muzzle. Ears united over the face for a

distance of 2 mm. The outer border of the auricle not scalloped on the line of the external basal ridge, but is uniformly rounded. The revolute margin reaches as far as the anterior border of this ridge. The inner border of the auricle retains six small marginal spines. The tragus is small pointed, or obscurely notched on the summit, and is but $\frac{1}{2}$ mm. high. The antitragus, as wide as high, much narrower above than at base; the notch posterior to it is well defined and reaches half way to the base. The external basal ridge is rudimental. The keel is not highly developed and measures 7 mm. in length. The first and fifth toes are thicker than in *N. brasiliensis*.

The tip of the third phalanx of the fourth finger is without projecting lobe.

The lips and adjacent surfaces are more tumid than in *N. brasiliensis*. The postmental wart is especially conspicuous as compared to the same structure in that species. As in *N. brasiliensis*, a medium ridge lies between the wart and the lower lip.

Measurements of Head and Ears.

	mm.
Distance from interauricular membrane to end of muzzle	3
Height of auricle	13
Distance of auricle to angle of mouth	2
Width and height of antitragus	3

In the entopatagium* the intercosto-humeral nerve divides into two terminal branches at the upper third of the wing membrane before reaching the elbow.

Four oblique lines in the positions of the intercostal nerves can be discerned.

The mesopatagium with the internal cutaneous nerves much the same as in *N. brasiliensis*; but the superior branches are much less numerous than in that species. The distal end of the second phalanx of the fifth finger is spatulate.

The nerves on the interspaces the same as in *N. brasiliensis*. First oblique band at radio-carpal angle attached at side of palmar surface of the muscle-mass of the fifth metacarpal bone and passes downward and inward at an angle to the radius for a distance of 4 mm. The pouch is conspicuous.

The tendon of the palmar interosseous muscle extends from the middle of the fifth metacarpal bone to the distal end of the first phalanx.

Fur on the back of a delicate fawn inclining to brown at the shoulders.

* For explanation of the terms entopatagium, and mesopatagium, see Proc. Acad. of Nat. Sci., Philadelphia, 1889, p. 314.

The back of the neck and head of a lighter shade. Back of the ear the hair is almost white and covers the posterior surface to a point just beyond the line answering to the keel. The fur of the venter is of a uniform light brown hue, verging to white. The wing membranes and tail membrane are of a brown color and are naked, excepting along a line continuous on the dorsum from the shoulder to the middle of the thigh. A delicate line of fur extends from the upper third of the arm to the middle of the thigh. The fur of the trunk both at the shoulder and thigh is continuous with this line, but on the entopatagium the hair is absent alongside of the body.

On the venter the foot and the distal third of the tibia are the only parts seen of the lower extremity, the remaining parts are concealed by a fold of skin which extends from the pubis to the lower third of the tibia.

The tail membrane with distinct pelvo-tibial line, but without the line from knee which is seen in *N. brasiliensis*. The free margin of the membrane without the lobe which is so well seen in the species last named.

The Cranium.—The superior angle of the occiput is more acute than in *N. brasiliensis* and smaller by one-half. The temporal crest is distinct throughout its entire length. In *N. brasiliensis* it is absent except at the anterior half. The dorsum of the face is without the groove so characteristic of *N. brasiliensis*. The anterior nasal aperture is ovate, not cordate, as in the species last named. The lachrymal process is conspicuous and trenchant. The zygomata are of uniform width. The mentum is recedent; the posterior border being on a line which extends between the second premolar and the first molar. The coronoid process is scarcely higher than condyloid; the angular process projects well back of the condyloid.

<i>Measurements.</i>	<i>N. europ.</i>	<i>N. brasiliensis.</i>
	mm.	mm.
Length.....	16	17
Width between zygomata posteriorly.....	9	10
Width of cranium at narrowest part.....	3	4
Distance from anterior edge second premolar to end of face.....	2½	1½

The Teeth.—

$$\text{Inc. } \frac{1-1}{2-2}, \text{ c. } \frac{1-1}{1-1}, \text{ pm. } \frac{2-2}{2-2}, \text{ m. } \frac{3-3}{3-3}$$

Upper incisors near together their entire length. Interval between them much less than in *N. brasiliensis*. First premolar lies to outer side of the postero-basal cingule of the canine, which almost touches the second premolar. In *N. brasiliensis* the first premolar is in line with the cingule. This distinction is associated with a shortening of the axis of the face from the centre of the incisorial space to the first premolar.

Lower incisors equal, bilobed, not crowded.

Measurements of Body.

	mm.	
Length of head and body	53	
“ “ tail in membrane.....	17	
“ “ “ free.....	19	
“ “ forearm.....	40	
“ “ first finger, including metacarpal.....	8	
“ “ second metacarpal....	39	mm. mm.
“ “ third “	40 ;	1st ph., 19 ; 2d ph., 15
“ “ fourth “	40 ;	“ 15 ; “ 3
“ “ fifth “	23 ;	“ 13 ; “ 3
“ “ tibia.....	11	
“ “ foot.....	7	

The description is based upon examination of twenty adult specimens, all females.

Habitat, Brazil. Collected by Prof. Harte. Prof. B. G. Wilder has kindly permitted me to study the Cheiroptera in the museum of Cornell University. The species above named was secured from this collection, where the type specimens remain.

N. europs resembles *N. megalotis** in the shape of ears and color of fur. It differs in the shape of the antitragus. *N. megalotis* is a larger form, the length of the body and head being 75 mm. (3'), and that of the forearm 56 mm. (2.35'), yet the length of the second phalanx of the fourth finger is less than 1 mm. (0'.1). This phalanx in *N. europs* measures 3 mm.

NYCTINOMUS ORTHOTIS, n. s.

The upper margin of the muzzle is below the plane of the dorsum of the face. The vertical ridge between the nostrils seen in *N. europs* and *N. brasiliensis* is absent. The nostrils are elliptical, slightly expanded above and look directly forward. The entire region of the muzzle abruptly cut off, and of quite peculiar physiognomy. There is no concavity in front of the ears. The upper border of the muzzle is not projecting, and without pectinate spines, but furnished with papillæ, which extend over the nostrils. The ears are erect, large, extending 4 mm. in advance of the muzzle, and are united on the dorsum of the face by a band 3 mm. high.

The general form of each ear is rounded and stands out from the head as in *N. brasiliensis*. No spines occur on the upper border. The outer border is furnished with a lap or hem of skin, which measures one-fifth of the diameter of the ear couch. It is slightly scalloped in the middle and extends as far forward as the end of the external basal ridge. The keel does not reach the antitragus ; it is thickened and not revolute. The anterior basal ridge forms a distinct projection at the notch. The notch

*Dobson, Cat. Cheiropt., Br. Mus., 1878, p. 434.

extends to the base of the antitragus. The antitragus is thin, broader than high and slightly higher posteriorly than anteriorly. A skin fold extends from the antitragus to the angle of the mouth. The tragus is quadrate and bears a general resemblance to that in *N. brasiliensis*. The sides of the face are without folds.

The fur on the dorsum is fawn color with paler tints at the base. It extends half way up the ears. On the dorsum the proximal half of the arm, the endopatagium near the body, and the basal fourth of the tail are covered with hair. On the venter the color is the same as on the back, except on the face and ears, where it is of a dark chestnut. The venter, the arm, the thigh and entopatagium half way to the elbow are covered with a thin layer of fur. The face is occupied by a number of stout bristles between the ears and the muzzle. Two hairs, 1 mm. long, project from the mental wart.

The following notes have been made on the terminal digits. That of the third digit of the third finger is little over 5 mm. in length, is slightly curved toward the trunk at the tip. A thin membrane is seen at the distal half at the thumb side. The wing membrane extends to the tip toward the trunk.

The terminal digit of the fourth finger is 3 mm. long. The membrane is not attached to the somad surface; while on the pollicad surface it is attached the entire length of the digit. The phalanx is markedly deflected on the free margin of the membrane and ends in a free lobe.

The terminal phalanx of the fifth finger is slightly curved somad. It is 3 mm. long, and nearly 1 mm. wide at base. The membrane is attached to the second phalanx at the middle of the pollicad margin, but reaches to the tip of the phalanx on the somad side.

No entopatagial lines are seen. The internal cutaneous line exhibits a superior branch. The nerve ends abruptly by inferior vertical branches as in *N. brasiliensis*. A line is seen on the interfemoral membrane extending from the middle of the thigh to the free margin of the membrane.

Cranium.—The cranium is of the type of *N. macrotis*. The facial region is high, the nasal bones at the anterior nasal aperture being the highest point of the vertex. The upper border of the aperture is defined by a transverse line, which forms a right angle with the lateral border. A line drawn downward from the border intersects the infraorbital foramen at its posterior limit. The zygoma is without elevation. The ethmoidal swelling (by which term is meant the swelling, in the orbito-temporal fossa, of the frontal bone over the ethmoid) is rounded. The palatal rugæ opposite the molars abruptly angulated, the angle being forwards.

In contrast to the above, the skull of *N. macrotis* presents the following: The facial region at the anterior nasal aperture is the lowest part of the vertex. The upper border of the aperture is Λ -shaped. A line produced downward lies in front of the infraorbital foramen. The zygoma with posterior elevation. The ethmoidal swelling is ridge-like.

The palatal rugæ opposite molars not angulated, but slightly curved, the curve being forwards.

Dental formula the same as in the preceding species.

The first maxillary premolar in *N. orthotis* is in the outer angle between the second premolar and the canine. It is smaller than in *N. macrotis*. The postero-internal cusp of the first and second maxillary molars continuous with a single crescentic cingulum. The cingulum of the third molar of the same series of a single crescentic form. Mandibular incisors four. The first mandibular premolar touches canine.

In *N. macrotis*, the first maxillary premolar is in dental arch, *i. e.*, is neither in outer or inner angle formed by the crowding of the canine tooth and the first premolar, but is in the axis of the dental series. The postero-internal cusp of the first and second maxillary molars separate from the double crescent form of the cingulum. The cingulum of the third molar of the same series of a double crescentic form.

Measurements.

	mm.		mm.	mm.
Length of head and body.....	68			
Height of ear.....	20			
Length of forearm.....	57			
“ “ thumb.....	5			
“ “ 2d metacarpal bone....	22			
“ “ 3d “ “	25	1st ph.,	10	2d ph., 9
“ “ 4th “ “	24	“	10	“ 4
“ “ 5th “ “	12	“	9	“ 3
“ “ tibia.....	20			
“ “ foot.....	7			
“ “ tail in membrane.....	25			
“ “ tail free.....	9			

Habitat, Jamaica. The single specimen is a skin in the collection of the National Museum (No. 9397, W. T. March), and was received from Spanishtown.

I have been minute in the description of these new forms for the reason that diagnoses of species have hitherto been too general. Some of the characters, such as the shapes of the terminal phalanges, the patterns of the wing membranes, the depth of the notch in the auricle and the point of termination of the auricular flange or hem have not been used in studying Chiroptera. Even if the attempt to establish new characters should fail, it is of interest to record these novel details of structure.

Stated Meeting, November 15, 1889.

Present, 10 members.

President, Mr. FRALEY, in the Chair.

Correspondence was submitted as follows:

From the Naturforschende Gesellschaft zu Emden, Hanover, an invitation to the celebration of the seventy-fifth anniversary of its foundation, December 29, 1889, to which the Secretaries were directed to make a suitable reply.

A photograph for the Society's album was received from Mr. George Harding, Philadelphia.

Letters of envoy were received from the Mines Department, Wellington, New Zealand; Musée Guimet, Paris, France; Literary and Philosophical Society, Manchester, Eng.; Theological Seminary, Andover, Mass.; Department of State, Washington, D. C.

Letters of acknowledgment from the Geological Society of London (127, 128, and Transactions, xvi, 2); Bureau of Statistics of Labor, Boston, Mass. (96-129, Catalog, Parts i-iv).

Letters of acknowledgment for 129 from the Geographical Society, St. Petersburg, Russia; Biblioteca N. V. E., Rome, Italy; K. Sächsische Gesellschaft der Wissenschaften, Leipzig, Saxony; Dr. John Evans, London, Eng.; and from the Tokyo Library, Japan, for 96-129, and Catalog.

The U. S. Department of Agriculture and the Nova Scotia Institute of Science were placed on the exchange list to receive Proceedings from No. 97.

Accessions to the Library were reported from the Royal Society of Victoria; Department of Mines, Melbourne; Académie de la Rochelle, France; Société d'Agriculture, Histoire Naturelle et Arts Utiles, Lyon; Société de l'Histoire de France, Redaction "Cosmos," Société de Médecine Pratique, Paris; Société des Antiquaires de la Morinie, St. Omer; Geological and Natural History Survey of Canada, Montreal;

Theological Seminary, Andover, Mass.; Dr. J. S. Newberry, New York; Dr. D. Jayne & Son, Mr. Henry Phillips, Jr., Misses Phillips, Philadelphia; U. S. Naval Observatory, Washington, D. C.; Free Public Library, San Francisco, Cal.

The Special Committee on C. R. Keyes' Paper reported progress, and was continued.

The President reported the appointment of Prof. Lesley to prepare the obituary notice of the late Leo Lesquereux, and that the same had been accepted.

The suggestions of the Board of Officers and Council were taken up and considered. On motion the Society requested the Park Commission to label the trees planted from the Michaux funds in such a way as will give their botanical and common names, the label to include the legend "From the Michaux Legacy;" and further requested the Park Commission to change the name of "Agricultural avenue to Michaux avenue."

New nominations 1194-1202 were read.

On report of the Committee on Finance, the Society appropriated \$50 towards the expenses attending the reception and entertainment of the American Folk-lore Association.

The Committee on the Michaux Legacy presented the following report:

To the American Philosophical Society :

The Michaux Committee respectfully reports, that at a meeting of the committee held on Monday, November 4, 1889, letters were received from Prof. J. T. Rothrock, stating that he had made preparations for the usual annual course of lectures to be delivered under the auspices of the Society in the hall of the Academy of Natural Sciences, Nineteenth and Race streets, on the Wednesday evenings of December 4, 11, 18, 1889, and January 8, 15, 22, 29, 1890. The following will be the subjects of his lectures :

1. Civilization as related to Surroundings.
2. Some neglected Trees.
3. Some famous Trees.
4. Trees along our Roadsides.
5. Trees in our Yards.
6. Trees we are Exterminating.
7. Practical Forestry.

All of these lectures, except the last one, will be illustrated by stereopticon views.

The suggestion of Prof. Rothrock met with the full approval of the committee, and it recommends the expenditure of \$264 from the appropriation of the Michaux fund, as follows :

Lecturer	\$140 00
Hall	14 00
Exhibitor, gas	60 00
Advertising	50 00
	<hr/>
	\$264 00

By order of the committee.

J. SERGEANT PRICE,
Secretary.

On motion, it was resolved that the report of the committee be accepted and the sum of \$264 be expended from the amount of the appropriation of the Michaux fund, as requested by it.

And the Society was adjourned by the President.

NOVEMBER 21, 1889, on this day, being the one hundredth anniversary of the Society's first meeting in its present Hall, a celebration of the event took place by an address at 4 P. M., in the Hall of the Society, by Hon. Frederick Fraley, LL.D., the President of the Society, and by a dinner at the Hotel Stratford at 6 P. M. A full report of the proceedings and addresses will be issued in Proceedings, No. 131.

Stated Meeting, December 6, 1889.

Present, 24 members.

Vice-President, Dr. RUSCHENBERGER, in the Chair.

Messrs. Andrew A. Blair, Clarence H. Clark and David K. Tuttle, lately elected members, were presented to the Chair and took their seats.

Correspondence was submitted as follows :

A letter from the President of the Society announcing that he had appointed Dr. Charles S. Wurts a member of the Committee on Finance *vice* Mr. Henry Winsor, deceased, and the action of the President was approved.

A letter from Dr. George Inman Riché, of Philadelphia, tendering his resignation from membership in the Society, which, on motion, was accepted.

A letter from B. A. Stephens, Los Angeles, Cal., in relation to a National Convention of Historical Societies, proposed to be held in Philadelphia on July 4, 1890, was referred to the Secretaries with power to act.

Letters of envoy were received from the Mining Department, Melbourne, Victoria; Société Impériale des Naturalistes, Moscow, Russia; Verein für Erdkunde, Dresden; R. Istituto di Studi Superiori, Florence, Italy; Royal Statistical Society, London; Boston Society of Natural History; U. S. Coast and Geodetic Survey, Washington, D.C.

Letters of acknowledgment (128) were received from the Royal Geographical Society, St. Petersburg; Mr. Samuel Davenport, Adelaide, Australia; Boston Society of Natural History.

Letters of acknowledgment (129) were received from the China Branch, Royal Asiatic Society, Shanghai; Geological Survey, Calcutta, India; Observatoire Astronomique et Physique, Tashkent, Russia; "Le Cosmos," Marquis de Nadaillac, Prof. Rémi Siméon, Paris; Maine Historical Society, Portland; Boston Society of Natural History; Academy of Natural Sciences, Davenport, Ia.

Accessions to the Library were announced from the Royal Society of Tasmania, Hobart; Mr. H. Y. L. Brown, Adelaide, Australia; Société Finnoise d'Archæologie, Helsingfors; Société Impériale des Naturalistes, Moscow, Russia; Magyar Tudományos Akademia, Budapest; Verein für Erdkunde, Dresden; Verein für Thüringische Geschichte, Jena; Publishers of the "Interpreter," Leipzig; Verein für Naturkunde, Offenbach a. M.; R. Istituto di Studi Superiori, Florence, Italy; Accademia di Scienze Morale et Politiche, Naples, Italy; Nova Scotian Institute of Natural Science, Halifax; American Philological Association, Dr. F. B. Stephenson, Boston; Rhode Island Historical Society, Providence; New York Forest Commission, Troy; Prof. Henry F. Osborne, Princeton, N.

J.; Messrs. W. S. Baker, Henry Phillips, Jr., Philadelphia; U. S. Department of Agriculture, U. S. Geological Survey, U. S. Coast and Geodetic Survey, Washington, D. C.; Ohio Agricultural Station, Columbus.

Donations to the Cabinet were received as follows:

A photograph of the Shingwauk Home for Indian Children, Sault Ste. Marie, Canada, from Rev. E. F. Wilson, Canada.

An engraving of the rear of the State House, Philadelphia, designed and published by W. Birch, 1800, from Mr. William S. Baker, Philadelphia.

The Committee on C. R. Keyes' Paper reported unfavorably upon the same, and the report being accepted the Committee was discharged.

The death of Rev. Joseph A. Murray, D.D., Carlisle, Pa., on November 27, 1889 (b. October 2, 1815), was announced.

The annual report of the Treasurer was presented and referred to the Committee on Finance.

The annual report of the Committee on Publication was presented.

The first annual report of the Committee on the Henry M. Phillips' Prize Essay Fund was presented.

A paper entitled "On a New Species of *Carollia*, with Remarks on *Carollia brevicauda*," by Dr. Harrison Allen, was read.

Mr. Phillips presented a second list of lacunæ in the Library of the Society.

Pending nominations 1194, 1195, 1196, 1197, 1198, 1199, 1200, 1201 and 1202 were read.

The Committee on the Centennial Celebration reported, and was discharged.

On motion the President was authorized to take such action as should to him seem best, upon the subject of a communication to be addressed to the Secretary of War relating to Prof. Haupt's System of Harbor Improvements.

And the Society was adjourned by the presiding member.

Stated Meeting, December 20, 1889.

Present, 24 members.

President, Mr. FRALEY, in the Chair.

Dr. C. E. Sajous, a lately elected member, was presented to the Chair, and took his seat.

Correspondence was submitted as follows:

An invitation to be present at the opening of the Public Library of Minneapolis, on December 16, 1889.

A request from the K. Leopold-Carol, Akademie, Halle a. S., for Proceedings No. 109, which was granted.

A letter from Dr. Rothrock, enclosing one from the Museum d'Histoire Naturelle, Section Botanique, Paris, returning thanks to the Society for the photographs presented from the Michaux fund.

Letters of envoy were received from the State Geological Survey, Columbus, Ohio; Kansas Historical Society, Topeka.

Letters of acknowledgment were received from the Société des Naturalistes, Kief, Russia (128, 129); Prof. J. S. Steenstrup, Copenhagen, Denmark (129); K. K. Naturhistorisches Hof-Museum, Vienna, Austria (129); Physiologische Gesellschaft, Berlin (129); Verein für Erdkunde, Halle a. S. (129); Dr. Julius Platzmann, Leipzig (129); Société des Sciences Naturelles et Archéologiques de la Creuse, Gueret, France (129); Musée Guimet, Paris (129); Cav. Damiano Muoni Milan (129); Marquis Antonio De Gregorio, Palermo, Sicily (127, 128, 129); University of Illinois, Champaign, Illinois (129); Bishop Crescencio Carrillo, Merida, Yucatan.

Accessions to the Library were announced from the Nederlandsche Botanische Vereeniging, Nijmegen; Statistika Central Byran, Stockholm, Sweden; K. K. Naturhistorisches Hof-Museum, Vienna, Austria; K. Gesellschaft der Wissenschaften, Göttingen, Prussia; Verein für Erdkunde, Stettin, Prussia; Mr. L. M. Billia, Milan, Italy; Rev. Edward F. Wilson, Sault Ste. Marie, Canada; Massachusetts Historical Society, Boston;

Mr. Isaac C. Martindale, Camden, N. J.; Semi-centennial Committee of the Central High School, Engineers' Club, Schuylkill Fishing Company of the State-in-Schuylkill, Messrs. E. D. Cope, Lewis M. Haupt, Henry Phillips, Jr., Philadelphia; Johns Hopkins University, Baltimore, Md.; U. S. National Museum, Washington, D. C.; Geological Survey of Ohio, Columbus; Kansas Historical Society, Topeka; Mr. Rafael M. Merchan, Bogota, S. A.

The deaths of the following members were announced:

Henry S. Frieze, Ann Arbor, Mich., December 7, 1889 (b. September 15, 1817).

Franklin B. Gowen, Philadelphia, December 14, 1889 (b. February 9, 1836).

On motion, the President was authorized, at his discretion, to appoint suitable persons to prepare the usual obituary notices of the deceased.

This being the evening for balloting for candidates for membership in the Society, pending nominations Nos. 1194, 1195, 1196, 1197, 1198, 1199, 1200, 1201 and 1202 were spoken to and voted upon.

New nominations Nos. 1203, 1204 and 1205 were read.

The report of the Finance Committee was presented, and the appropriations for the succeeding year were passed.

The President reported that he had caused to be engrossed a letter to the Secretary of War* in reference to Prof. Haupt's invention, and that he intended to sign and send it to-morrow.

After all the business of the meeting was concluded, the ballot box was opened and the votes counted, and the result of the poll having been announced to the President, he declared the following-named persons to have been duly elected members of the Society:

No. 2167. Dr. Friederich S. Krauss, Vienna.

No. 2168. Sir George G. Stokes, President of the Royal Society of London.

No. 2169. Rt. Rev. John J. Keane, Rector of the Catholic University, Washington, D. C.

* See Minutes, December 6, 1889.

No. 2170. Dr. Charles C. Abbott, Trenton, N. J.

No. 2171. Dr. George Friebis, Philadelphia.

No. 2172. Dr. Fernando Cruz, Minister of Guatemala, Washington, D. C.

No. 2173. A. Sydney Biddle, Professor of Law in the University of Pennsylvania, Philadelphia.

No. 2174. J. M. Le Moine, President of the Historical and Literary Society of Quebec, Canada.

And the Society was adjourned by the President.

LIST OF DEFICIENCIES
IN THE
Library of the American Philosophical Society.

PART SECOND.

(Read before the American Philosophical Society, December 6, 1889.)

PUBLICATIONS OF SOCIETIES CONTINUED.*
EUROPE.

AUSTRIA.

Böhmische Gesellschaft der Wissenschaften, Prag.

Abhandlungen, all before 1875 to VII Folge 1886.

Sitzungsbericht, all before 1886.

Jahresbericht, all before 1886.

Naturforschende Verein, Brünn.

Verhandlungen, all before XXIV Band, 1885.

Meteorologische Commission, Brünn.

Bericht, all before IV, 1886.

Anthropologische Gesellschaft, Vienna.

Mittheilungen, Band I, 1870, all after No. 14 if any, and Title-page and Index.

K. K. Geologische Reichsanstalt, Vienna.

Abhandlungen :

Vol. IV, pages 1-116.

Vol. V, all after Heft 6.

Vol. VI, all after Heft 2.

Vol. XI, all after Heft 2.

Verhandlungen :

1867, pages 113-203 and Title-page.

1869, Title-page.

1870, pages 95-173.

1871, " 87-107.

1874, " 329-377.

*The Society will be pleased to receive as donations any of the publications mentioned in this list.

1882, pages 190-206.

1883, " 1-98.

1884, " 1-52.

Akademis der Wissenschaften, Vienna.

Sitzungs (Phil. Hist. Cl.) :

Vols. I, II, III.

Vol. VIII, all after Heft 2.

Vol. IX, all except Heft 4.

Vol. X, all except Heft 5.

Vol. XVII, all after Heft 2 (if any).

Vol. XVIII, whole volume.

Vol. XIX, Heft 1.

Vol. LIV, whole volume.

Vol. CIV, Heft 1.

Sitzungs (Math.-Natur. Cl.) :

Vols. I, II, III, IV, V, VI, VII, IX.

Vol. LXXXV, 1st Abth., Hefts 1, 2, 3.

Almanachs, all before 1855.

Registers :

(Phil. Hist. Cl.) all before 1854 and after 1879, 81 bis 90.

(Math. Natur. Cl.) all before 1854 and after 1880, 76 bis 80.

DENMARK.

K. Nordiske Oldskrift Selskab, Copenhagen.

Memoirs [1st Series], all before 1835.

[New Series], all between 1860 and 1866.

Aarbøger, all before 1866.

Tillaeg till Arbögen, all before 1866.

Antiquarisk Tidsskrift, all before 1843.

Annual Reports, all before 1834, also 1835, 1837 and all after 1839.

FRANCE.

Société Philomathique, Paris.

Bulletin :

[Old Series] any after Vol. III.

[New Series] all after 1824.

Extraits des Procès-verbaux, all except Séances de 1836-1838 (inclusive).

Société Ethnographique, Paris.

Mémoires, all after Tome II, 1845.

Bulletin, all except Tome 1^{re} Année 1846.

Tome 1^{re} Année 1847.

Société d'Histoire Naturelle de Strasbourg.

Mémoires :

Tome IV, 1^{re} Livraison.Tome V, 1^{re} Livraison.

And all after Tome VI, 2.

Bulletin :

1^{re} Année, No. 2.2^d Année all after No. 7, and the succeeding années.*Société des Sciences Naturelles and Archéologiques de la Creuse, Guéret.*

Mémoires, all except Tome V, and all other publications of the society.

*Société Américaine de France, Paris.*Archives [Old Series], all except Tome 1^{er}, 1857-1859, pp. 1-32.

[Nouvelle Série] Tome I.

Tome III, Parts 1 and 2.

Tome IV, all after Part 3.

Tome V, Parts 1, 2, 3.

Tome VI, and all after to date.

Annuaire, all before and after 1873 to 1880 (inclusive); 1884 to date.

JAVA.*Bataviaasche Genootschap van Kunsten en Wetenschappen, Batavia.*

Verhandlungen, XVI D, XVIII D to XXII D (inclusive).

Tidschrift voor Indische Taal-, Land- en Volkenkunde :

[N. S.] Deels I, II, III, 2 afl., and any after 6 afl.

[3^e S.] Deel I, afl. 3, and any after 4 afl.

Deel II, afl. 1.

[6^e S.] Deel I, Title-page and Index.

Register op de Notulen, all except 1867 to 1878.

Catalogus der Bibliotheek, any before 1864, and after except 1877.

Catalogus Numismatische afdeeling, all except 1869, 1877.

Catalogus Ethnologische Afdeeling, all except 1877.

Catalogus Numismatische Verzameling, all except 1886.

Catalogus der Archeologische Verzameling, all except 1887.

NETHERLANDS.*Bataafsch Genootschap van Proefondere vindingrijke Wijsbegeerte, Rotterdam.*

Nieuwe Verhandelingen, all after II Reeks; III Deel, 2 Stuk. 1885 to date.

Programme, any before 1861; also 1862, 1864-1868 (inclusive), 1870, 1871, 1873, 1875, 1877-1879 (inclusive), 1881, 1883, 1885.

K. Zoologisch-Botanische Genootschap, 's Gravenhage.

Verslag jaar, all before 1885, and any other publications of the society.

Hollandsche Maatschappij der Wetenschappen, Haarlem.

Verhandelingen, all before XXX Deel, 1754, and any after 1793.

Naturkunde Verhandelingen :

[1st Ser.] any after XX, 1832.

[2nd Ser.] III, 2 ; V, 2 ; VII ; IX ; XI, 2 ; XII ; XX ; and any after XXV.

[3rd Ser.] II, 1, 2 ; III ; IV, 2, and all after Part 3.

Programmes, any before and after 1867 to 1873 (inclusive), 1875, 1877, 1878, 1881.

Archives Ne'erlandaise :

Tome VIII, 1, 2, 5.

Tome IX, 1, 2, 3.

Tome XIII, 4, 5.

Tome XVI, 3, 4, 5.

Tome XIX, 3.

Nederlandsche Botanische Verein, Nijmegen.

Nederlandsche Kruidkundig Archief, all before Deel IV ; also Deel IV, 1.

[2 Ser.] Deel I, 1 ; II, 4 ; III, 1 ; IV, 1, 2.

RUSSIA.*Impériale Société des Naturalistes, Moscou.*

Bulletin, Vols. II-VIII (inclusive), and any of that series after Vol. IX, 1837.

[N. S.] 1839, 1842, 1843.

1851, 1.

1858, 2, 3, 4.

1859, 1.

1861, 1862, 1863, 1864, 1.

Nouveaux Mémoires, Vols. I, II, III, V, VI, VIII, IX, XIII, 1 ; XIV, 3.

SWEDEN.*R. Societatis Scientiarum Upsaliensis, Upsal.*

Nova Acta [Ser. 1], Vols. IX, XI, and any after XII.

Académie Royale des Sciences, Stockholm.

Oversigt, 1848, No. 4.

Handlinger, Tome III, Trimestre for July, August, September, 1872.

Tal hallet vid præfidi nedlaggen uti K. Ved. Akad., all before 1839, also 1840, 1844-1848 (inclusive), 1850-1855 (inclusive), and any after 1856.

Lists of Members, all before 1861, also 1870, 1871, 1876, 1877.

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2157. Andrew A. Blair	Philadelphia.
2158. Clarence H. Clark	Philadelphia.
2159. Henry D. Gregory	Philadelphia.

October 18, 1889.

No. 2160. Walter J. Hoffman, M.D.	Washington, D. C.
2161. J. W. Powell	Washington, D.C.
2162. G. Brown Goode	Washington, D. C.
2163. Lyon G. Tyler	Williamsburgh, Va.
2164. James B. Angell	Ann Arbor, Mich.
2165. Henry Hazlehurst	Philadelphia.
2166. David K. Tuttle	Philadelphia.

December 20, 1889.

No. 2167. Dr. Friederich S. Krauss	Vienna.
2168. Sir George G. Stokes	London.
2169. Rt. Rev. John J. Keane	Washington, D. C.
2170. Dr. Charles C. Abbott	Trenton, N. J.
2171. Dr. George Friebis	Philadelphia.
2172. Dr. Fernando Cruz (of Guatemala).	Washington, D. C.
2173. A. Sydney Biddle	Philadelphia.
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